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# Everyday arithmetic

Franklin Sherman  
Hoyt

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# • EVERYDAY ARITHMETIC

## PRIMARY BOOK

BY

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# **FOREWORD**

## **AND**

### **BRIEF SUGGESTIONS TO TEACHERS**

**THIS** book, which is intended for use in the third and fourth year of school, aims primarily to give pupils a thorough mastery of fundamental number facts and processes and their simpler application to everyday experiences.

The work is arranged so that the pupils will acquire skill in computing, but in approaching the formal aspects of the work, the book makes an important departure from the textbooks of the past. The problems and exercises are grouped by situations taken from actual experience, so that a child meets number as vitally related to his home and school interests. Each new process is taught in connection with a concrete situation requiring its use. Each group of problems is centered about a familiar activity.

The advantages of this grouping are threefold: It gives a child insight into the purpose of number work and wins his hearty co-operation; it breaks down the artificial barrier between the arithmetic that is taught in the schoolroom and that which a child meets in his outside experience, so that the two become interwoven and both are enriched; further, it gives a child that which is of prime importance, power to use the number processes under conditions similar to those that confront him in life.

From the formal standpoint, recent investigations in the teaching of arithmetic have shown a need of more systematic treatment of the fundamental facts and processes. The organizations of the formal work in this book is such as to make provision for daily practice work in the essential processes, and at the same time for a differentiation, one at a time, of limited groups of number facts for complete and automatic mastery. No child is asked to compute with numbers that he has not had an opportunity to master thoroughly.

In this way bad habits are avoided, and speed and accuracy commensurate with a child's maturity are secured.

Another aspect of the work that demands attention in the modern schoolroom is the differences in the ability of pupils. To meet this need, this book suggests the making of original problems, which gives a pupil an opportunity to use his ability to the fullest extent; it provides starred optional problems, intended to stimulate the abler pupils without discouraging those pupils who have neither the time nor the strength to solve them. Moreover, it supplies tests and supplementary drills for those pupils who fall below the standard of their classmates.

## BRIEF SUGGESTIONS TO TEACHERS

Teach each new topic from the blackboard and then use the books to help fix the work in the minds of the pupils.

In working for accuracy, cultivate in the pupil the habit of writing figures neatly, of computing rapidly, and of testing all answers.

Train pupils to use few words in computing, and avoid such crutches as the crossing out of figures in "borrowing" in subtraction.

Endeavor to make all problems significant to pupils.

Lay the emphasis on oral rather than on written problems.

In the solution of oral problems, require answers only, except where difficulties are met and explanations are necessary. See that this work moves rapidly and is enjoyed by all. In written work occasionally ask pupils, before solving a set of problems, to explain how the answers are found. Encourage pupils to make clear statements, but do not force them to follow a set form of analysis. (See suggestions, also, in footnotes on page 210.)

Prepare for each set of problems in the book by giving similar problems to the class orally. When all the types in a set of problems have been mastered, use the problems in the book as a review.

In measuring the work of pupils, if a teacher so desires, the tests in the book may be varied by changing the numbers slightly.

# PART ONE

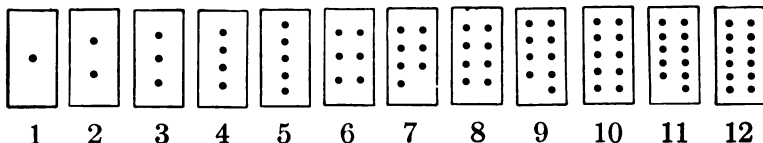
## CHAPTER I. REVIEW OF FIRST STEPS IN NUMBER

### 1. Playing School



1. The children in this picture are playing school. How many children are there in the first row?
2. How many children are there in the second row? In the third row? In the fourth row?
3. A pencil is to be passed to each pupil. How many pencils are needed for the children in the two front rows?
4. How many pencils are needed for the other children?
5. Find, by counting, how many children there are in the picture.





6. Play that your classmates are your pupils.<sup>1</sup> Show them what is meant by:

2 pencils.	6 books.	7 pieces of chalk.
1 pencil.	4 books.	10 pieces of chalk.
3 pencils.	8 books.	11 pieces of chalk.
5 pencils.	9 books.	12 pieces of chalk.

If I should give away all my books I would have none left. The figure that means none is called zero.

0 (zero) means **none**, or **not any**.

7. Place together for your pupils to count:

2 books and 0 books.	3 books and 0 books.
2 books and 1 book.	3 books and 2 books.
2 books and 2 books.	3 books and 3 books.

8. Write the figures that stand for:

one	two	six	eight	nine	eleven
three	four	five	ten	seven	twelve

9. Have your pupils read your figures. Then have them practice writing on the board the words that stand for:

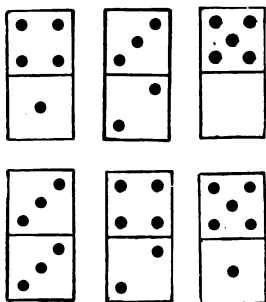
0 1 2 3 4 5 6 7 8 9 10 11 12

<sup>1</sup> TO THE TEACHER: The children take turns in acting as "teacher" in this play. One child follows one direction, another child the next.

## 2. Making Cards for Number Games

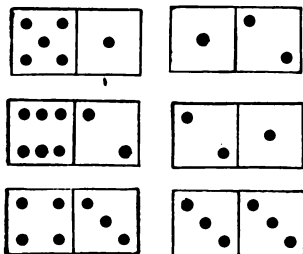
To play the games shown below, make a set of domino cards like those on page 4. Each card may be cut one inch wide and two inches long.<sup>1</sup>

### MATCHING THE NUMBER OF SPOTS



Place in a row on your desk the domino cards that have this same number of spots. In the upper row shown here the cards all have five spots on them. 4 and 1 are 5. 3 and 2 are 5. 5 and 0 are 5. What can you say of the number of spots on the cards in the next row?

### END TO END MATCHING OF DOMINO CARDS

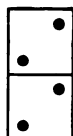
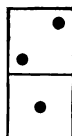
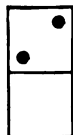
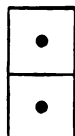
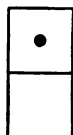


In this game the cards are placed so that the ends that match are together and the spots on the outer ends count to seven or some other number chosen. To play the game choose a number like eight or nine and see how many pairs of cards you can get.

<sup>1</sup> Oak tag or heavy drawing paper may be used for the cards and each child given 2 strips 14 inches by 2 inches from which to cut his cards. Before cutting have pupils draw cross lines 1 inch apart, thus dividing the strips into sections 1 inch by 2 inches. The spots may be made of gold stars (easily purchased) or they may be put on in pencil by the pupils. The cards missing from page 4 are the double blank, the *blank* with the *three*, *four*, *five* and *six*, and the *one* with the *four*, *five*, and *six*. These should be drawn at the board. For the second game two sets of cards are needed.

## 3. Domino Cards

The sign  $+$  is read **and**. The sign  $=$  is read **is** or **are**.



$1+0=?$

$1+1=?$

$2+0=?$

$2+1=?$

$2+2=?$

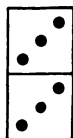
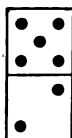
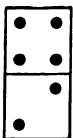
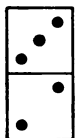
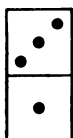
$0+1=?$

$2 \text{ ones}=?$

$0+2=?$

$1+2=?$

$2 \text{ twos}=?$



$3+1=?$

$3+2=?$

$4+2=?$

$5+2=?$

$3+3=?$

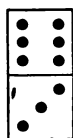
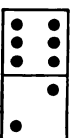
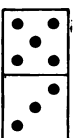
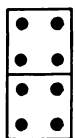
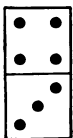
$1+3=?$

$2+3=?$

$2+4=?$

$2+5=?$

$2 \text{ threes}=?$



$4+3=?$

$4+4=?$

$5+3=?$

$6+2=?$

$6+3=?$

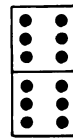
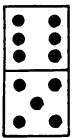
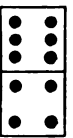
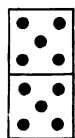
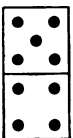
$3+4=?$

$2 \text{ fours}=?$

$3+5=?$

$2+6=?$

$3+6=?$



$5+4=?$

$5+5=?$

$6+4=?$

$6+5=?$

$6+6=?$

$4+5=?$

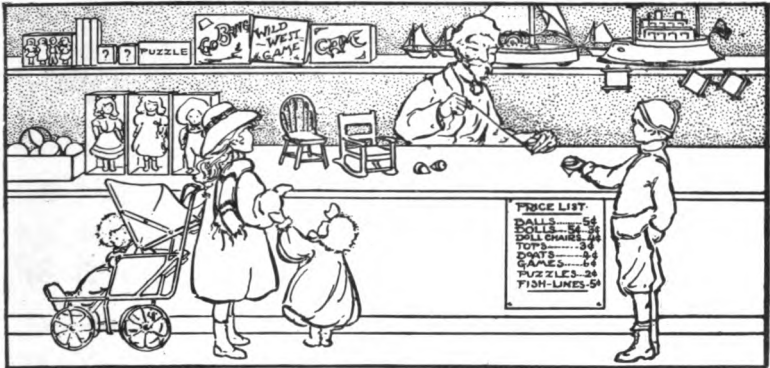
$2 \text{ fives}=?$

$4+6=?$

$5+6=?$

$2 \text{ sixes}=?$

# 4. Buying Toys <sup>1</sup>



## I

1. Ruth went to a toy store to buy playthings for her baby brother. She bought a rattle for 5 cents and a ball for 3 cents. How much did the two playthings cost?

2. Robert bought, at a toy store, a top for 3 cents and a boat for 4 cents. How much money did he spend?

3. Play you have 10 cents to spend for toys. Tell what you would buy.

4. Make a problem about buying a fish line for 5 cents and a fishhook for 2 cents.

<sup>1</sup> TO THE TEACHER: For the children to gain power in applying number, it is essential that the work be in part an outgrowth of activities in which they are given an opportunity to measure and compute. For this purpose teachers will find it profitable to use "playing-store" and other dramatized occupations. The first store might well be a "cent store" in which apples, pencils, and other objects are sold at a few cents apiece and bought with pennies. See, also, pages 68, 69, 71, and 78 of Part One. These plays and others like them will be found particularly helpful as a direct preparation for problem work.

Find the cost:

5. Of a 5-cent doll and a 4-cent chair.
6. Of a 5-cent ball and a 6-cent game.
7. Of a 4-cent boat, a 3-cent flag, and a 2-cent puzzle.
8. Of 2 paper dolls at 2 cents each.
9. Of 2 tops at 3 cents each.
10. Of 2 picture books at 5 cents each.
11. Make other problems about buying toys.

## II

1. With the help of pennies, find how many cents must be put with 2 cents to make 3 cents.<sup>1</sup>

2. How many cents are left if, out of 3 cents, 2 cents are spent? 3 less 2 is how many?

3. How many cents must be put with 3 cents to make 5 cents?

4. How many cents are left when 3 cents are taken from 5 cents? 5 cents less 3 cents is how many?

5. How many balls are left when 2 balls are taken from 4 balls? 4 less 2 is how many?

6. How many dolls are left when 3 dolls are taken from 4 dolls? 4 less 3 is how many?

<sup>1</sup> Subtraction facts are most easily taught as a form of addition. Since  $2 + 3 = 5$ , to find the difference between 5 and 2, the pupil thinks "2 and ? = 5," and thus finds the answer 3. A child may be taught to say "5 less 2 = 3," or "2 from 5 = 3"; but if he has been trained by this method, he gets his answer by thinking what number put with 2 makes 5. For further note on the relation of addition to subtraction, see page 56.

The sign  $-$  is read **less**.

7. $1 + ? = 4$	$3 + ? = 6$	$4 + ? = 7$
4 less 1 = ?	6 less 3 = ?	7 less 4 = ?
$4 - 1 = ?$	$6 - 3 = ?$	$7 - 4 = ?$

Find how many cents are left:

8. Mary has 5 cents and spends 3 cents for a doll.
9. John has 7 cents and spends 3 cents for a top.
10. Robert has 8 cents and spends 5 cents for a ball.
11. Helen has 10 cents and spends 5 cents for jackstones.
12. Margaret has 9 cents and spends 4 cents for a book.

### 5. Practice with the Numbers One to Six

Find answers:

1. $1 + 0 = ?$	2. $4 + 1 = ?$	3. $5 + 2 = ?$	4. $6 + 4 = ?$
$2 + 1 = ?$	$4 + 3 = ?$	$5 + 4 = ?$	$6 + 3 = ?$
$2 + 2 = ?$	$4 + 2 = ?$	$5 + 5 = ?$	$6 + 5 = ?$
$3 + 1 = ?$	$4 + 4 = ?$	$3 + 5 = ?$	$4 + 6 = ?$
$3 + 2 = ?$	$5 + 1 = ?$	$4 + 5 = ?$	$5 + 6 = ?$
$3 + 3 = ?$	$5 + 3 = ?$	$6 + 2 = ?$	$6 + 6 = ?$
5. $1 + ? = 2$	6. $2 - 1 = ?$	7. $5 + ? = 7$	8. $7 - 5 = ?$
$2 + ? = 3$	$3 - 2 = ?$	$5 + ? = 9$	$9 - 5 = ?$
$2 + ? = 4$	$4 - 2 = ?$	$5 + ? = 10$	$10 - 5 = ?$
$3 + ? = 4$	$4 - 3 = ?$	$5 + ? = 8$	$8 - 5 = ?$
$3 + ? = 5$	$5 - 3 = ?$	$4 + ? = 9$	$9 - 4 = ?$
$3 + ? = 6$	$6 - 3 = ?$	$6 + ? = 8$	$8 - 6 = ?$

9.  $4 + ? = 5$     10.  $5 - 4 = ?$     11.  $6 + ? = 11$     12.  $11 - 6 = ?$   
 $4 + ? = 7$      $7 - 4 = ?$      $6 + ? = 10$      $10 - 6 = ?$   
 $4 + ? = 6$      $6 - 4 = ?$      $6 + ? = 9$      $9 - 6 = ?$   
 $4 + ? = 8$      $8 - 4 = ?$      $6 + ? = 12$      $12 - 6 = ?$

### 6. Playing Clerk<sup>1</sup>

1. Play that you are a clerk in a store and that a customer asks for 6 apples. Put the apples into a paper bag, 2 at a time.



2. How many apples are 2 apples and 2 apples? How many is 2 times 2 apples?

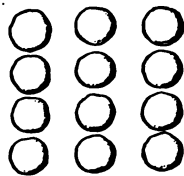
3. How many apples have you when you have taken 2 apples 3 times?

4. Find, by counting, how many apples there are when 3 apples are taken 2 times.

5. When do you sell the greater number of apples, when you sell 2 times 3 apples or when you sell 3 times 2 apples?

6. Play that a customer asks for 12 cookies. Count them out, 3 at a time.

7. How many cookies have you when you have taken 2 times 3 cookies? When you have taken 3 times 3 cookies? When you have taken 4 times 3 cookies?



8. Count out twelve pieces of chalk, 4 at a time. How many

<sup>1</sup> In this play, circles of cardboard are used to represent cookies; and if apples and oranges are not at hand, balls, wooden spheres, or other convenient objects are used to represent them.

is 2 times 4 pieces of chalk? How many is 3 times 4 pieces of chalk?

9. Which is greater, 3 times 4 or 4 times 3?

10. Fill 2 bags with oranges, placing 6 oranges in each. How many is 2 times 6 oranges?

The sign  $\times$  is read times.

- |                  |                  |                  |
|------------------|------------------|------------------|
| 11. 2 threes = ? | 3 ones = ?       | 4 twos = ?       |
| 2 times 3 = ?    | 3 times 1 = ?    | 4 times 2 = ?    |
| $2 \times 3 = ?$ | $3 \times 1 = ?$ | $4 \times 2 = ?$ |

- |                 |                  |                 |                  |
|-----------------|------------------|-----------------|------------------|
| 12. $1 + 1 = ?$ | $2 \times 1 = ?$ | $6 + 6 = ?$     | $2 \times 6 = ?$ |
| $2 + 2 = ?$     | $2 \times 2 = ?$ | $2 + 2 + 2 = ?$ | $3 \times 2 = ?$ |
| $4 + 4 = ?$     | $2 \times 4 = ?$ | $3 + 3 + 3 = ?$ | $3 \times 3 = ?$ |
| $5 + 5 = ?$     | $2 \times 5 = ?$ | $4 + 4 + 4 = ?$ | $3 \times 4 = ?$ |

### 7. Sharing with Others

1. Tom has 4 chestnuts to divide equally between himself and his brother. How many chestnuts must he give his brother?



One of two equal parts is called one half.

2. How many chestnuts are there in one half of 4 chestnuts?

3. Place 6 cents in two equal piles. What is one half of 6 cents?

4. How can you find one half of 8 cents? Of 10 cents?

5. What is one half of 8 books? Of 10 pencils? Of 12 rulers?



6. Robert has 9 apples to divide equally among 3 play-mates. How many will he give to each?



One of three equal parts is called one third.

7. What is one third of 9 apples?

8. John has 6 pieces of candy. How can he find one third of them?

9. Mary had 12 oranges and gave away one third of them. How many did she give away?

10. Divide 8 cents so that there are 4 equal piles.

One of four equal parts is called one fourth.



11. What is one fourth of 8 cents?



12. Find one fourth of 4 pieces of chalk. Of 12 pieces.

13. Helen divided 12 paper dolls equally among 4 girls. What part of the number did each girl have? How many dolls did each get?

One half may be written  $\frac{1}{2}$ . One third may be written  $\frac{1}{3}$ .

One fourth may be written  $\frac{1}{4}$ .

14.  $\frac{1}{2}$  of 2 = ?     $\frac{1}{2}$  of 8 = ?     $\frac{1}{3}$  of 6 = ?     $\frac{1}{4}$  of 4 = ?  
 $\frac{1}{2}$  of 4 = ?     $\frac{1}{2}$  of 10 = ?     $\frac{1}{3}$  of 9 = ?     $\frac{1}{4}$  of 8 = ?  
 $\frac{1}{2}$  of 6 = ?     $\frac{1}{2}$  of 12 = ?     $\frac{1}{3}$  of 12 = ?     $\frac{1}{4}$  of 12 = ?

# 8. Buying Part of a Dozen

1 dozen = 12.

1. How many eggs in a dozen? In a half-dozen?
2. I buy 6 eggs. What part of a dozen do I buy?
3. How can one third of a dozen eggs be found? How is one fourth of a dozen found?



4. Mary bought 3 oranges. What part of a dozen did she buy?
5. Robert bought 4 lemons. What part of a dozen did he buy?
6. Make a problem about  $\frac{1}{2}$  dozen bananas.
7. Make a problem about  $\frac{1}{4}$  dozen apples.
8. Which would you rather have,  $\frac{1}{4}$  of a dozen oranges or  $\frac{1}{3}$  of a dozen? Why?

# 9. Review

- |                |                |                |                |
|----------------|----------------|----------------|----------------|
| 1. $2 + ? = 3$ | 2. $3 - 2 = ?$ | 3. $5 + ? = 9$ | 4. $9 - 5 = ?$ |
| $3 + ? = 5$    | $5 - 3 = ?$    | $5 + ? = 8$    | $8 - 5 = ?$    |
| $4 + ? = 5$    | $5 - 4 = ?$    | $5 + ? = 10$   | $10 - 5 = ?$   |
| $3 + ? = 7$    | $7 - 3 = ?$    | $6 + ? = 9$    | $9 - 6 = ?$    |
| $4 + ? = 6$    | $6 - 4 = ?$    | $6 + ? = 8$    | $8 - 6 = ?$    |
| $5 + ? = 7$    | $7 - 5 = ?$    | $6 + ? = 11$   | $11 - 6 = ?$   |
| $4 + ? = 7$    | $7 - 4 = ?$    | $6 + ? = 10$   | $10 - 6 = ?$   |
| $4 + ? = 8$    | $8 - 4 = ?$    | $6 + ? = 12$   | $12 - 6 = ?$   |

5.  $4+4=?$     6.  $2\times 4=?$     7.  $3+3+3=?$     8.  $\frac{1}{2}$  of  $4=?$   
 $0+0=?$      $2\times 0=?$      $2+2+2=?$      $\frac{1}{2}$  of  $10=?$   
 $2+2=?$      $2\times 2=?$      $4+4+4=?$      $\frac{1}{3}$  of  $6=?$   
 $5+5=?$      $2\times 5=?$      $3\times 3=?$      $\frac{1}{3}$  of  $12=?$   
 $3+3=?$      $2\times 3=?$      $3\times 2=?$      $\frac{1}{4}$  of  $8=?$   
 $6+6=?$      $2\times 6=?$      $3\times 4=?$      $\frac{1}{4}$  of  $12=?$

### 10. Building Numbers to Thirty

1. How many are ten and one?
2. How many are ten and two?

 This is a picture of ten sticks tied in a bundle.

 = 13 (thirteen).       = 17 (seventeen).

 = 14 (fourteen).       = 18 (eighteen).

 = 15 (fifteen).       = 19 (nineteen).

 = 16 (sixteen).       = 20 (twenty).

3. Name, and then write, the number that means:

10 and 2.	10 and 5.	10 and 9.
10 and 4.	10 and 7.	10 and 8.
10 and 3.	10 and 6.	10 and 10.

4. Read, then build with sticks:

13      17      14      20      18      15      19

5. What number equals:

2 tens and 1?	2 tens and 6?
2 tens and 2?	2 tens and 7?
2 tens and 3?	2 tens and 8?
2 tens and 4?	2 tens and 9?
2 tens and 5?	3 tens?

6. Read, and then tell how to build with sticks:

20	21	23	22	25	24
26	27	29	28	30	

# 11. Adding Numbers in Columns

The problem  $6 + 6 = ?$  is often written in column form in this way: Add 6

$$\begin{array}{r} 6 \\ \hline \end{array}$$

The answer is written beneath, thus: 6

$$\begin{array}{r} 6 \\ \hline 12 \end{array}$$

1. Write in column form and find answers:

$$5 + 5 = ? \quad 5 + 4 = ? \quad 2 + 2 + 3 = ? \quad 4 + 2 + 2 = ?$$

Add:

$$\begin{array}{r} 2 \quad 4 \quad 1 \quad 5 \quad 3 \quad 2 \quad 4 \quad 2 \quad 3 \\ 3 \quad 4 \quad 2 \quad 0 \quad 3 \quad 5 \quad 5 \quad 6 \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \quad 2 \quad 1 \quad 3 \quad 2 \quad 2 \quad 3 \quad 1 \quad 2 \\ 3 \quad 1 \quad 3 \quad 3 \quad 2 \quad 2 \quad 3 \quad 0 \quad 2 \\ 2 \quad 1 \quad 3 \quad 2 \quad 2 \quad 4 \quad 3 \quad 6 \quad 5 \\ \hline \end{array}$$

An answer found by adding is called a **sum**.

Find the sums:

$$\begin{array}{r} 4. \quad 4 \quad 2 \quad 5 \quad 2 \quad 3 \quad 5 \quad 0 \quad 5 \quad 6 \\ \quad \underline{6} \quad \underline{2} \quad \underline{3} \quad \underline{4} \quad \underline{6} \quad \underline{5} \quad \underline{6} \quad \underline{4} \quad \underline{5} \end{array}$$

$$\begin{array}{r} 5. \quad 3 \quad 5 \quad 6 \quad 2 \quad 1 \quad 5 \quad 0 \quad 4 \quad 4 \\ \quad \underline{2} \quad \underline{0} \quad \underline{5} \quad \underline{3} \quad \underline{2} \quad \underline{2} \quad \underline{3} \quad \underline{3} \quad \underline{1} \\ \quad \underline{2} \quad \underline{3} \quad \underline{0} \quad \underline{5} \quad \underline{6} \quad \underline{2} \quad \underline{2} \quad \underline{3} \quad \underline{4} \end{array}$$

## 12. Subtracting Numbers in Columns

The problem  $11 - 5 = ?$  is often written: Subtract 11

$\underline{5}$

This problem is read "11 less 5 is how many?" or "5 from 11 is how many?"

The answer is written beneath: 11

$\underline{5}$   
6

Subtract:

$$\begin{array}{r} 1. \quad 5 \quad 4 \quad 6 \quad 5 \quad 7 \quad 6 \quad 8 \quad 8 \quad 7 \\ \quad \underline{2} \quad \underline{1} \quad \underline{2} \quad \underline{0} \quad \underline{3} \quad \underline{3} \quad \underline{2} \quad \underline{4} \quad \underline{1} \end{array}$$

$$\begin{array}{r} 2. \quad 5 \quad 4 \quad 6 \quad 7 \quad 9 \quad 8 \quad 9 \quad 7 \quad 8 \\ \quad \underline{1} \quad \underline{2} \quad \underline{5} \quad \underline{2} \quad \underline{3} \quad \underline{5} \quad \underline{4} \quad \underline{6} \quad \underline{0} \end{array}$$

$$\begin{array}{r} 3. \quad 9 \quad 11 \quad 8 \quad 10 \quad 7 \quad 9 \quad 11 \quad 10 \quad 12 \\ \quad \underline{5} \quad \underline{6} \quad \underline{3} \quad \underline{6} \quad \underline{4} \quad \underline{0} \quad \underline{5} \quad \underline{5} \quad \underline{6} \end{array}$$

<sup>1</sup> When additive subtraction is taught, the form used is "5 and what are 11?"

**13. Game: "I am Thinking of Two Numbers"**

One child stands before his class and says, "I am thinking of the sum of two numbers, one of which is 6." The other children take turns asking questions like these: "Is it, 6 and 3 are 9?" "Is it, 6 and 5 are 11?" and so on until the right sum is named. The child who is the first to name the answer desired then has a chance to stand before his class and give a new sum to be guessed.

**14. Practice with the Number Seven**

To play the game given above with the number seven, first find and learn the answers to these questions:

1. $7 + 0 = ?$	2. $7 + 7 = ?$	3. $8 - 7 = ?$	4. 2 7's = ?
$7 + 1 = ?$	$2 + 7 = ?$	$10 - 7 = ?$	$2 \times 7 = ?$
$7 + 2 = ?$	$4 + 7 = ?$	$9 - 7 = ?$	$1 \times 7 = ?$
$7 + 3 = ?$	$1 + 7 = ?$	$11 - 7 = ?$	$0 \times 7 = ?$
$7 + 4 = ?$	$3 + 7 = ?$	$13 - 7 = ?$	$7 \times 1 = ?$
$7 + 5 = ?$	$6 + 7 = ?$	$12 - 7 = ?$	$7 \times 0 = ?$
$7 + 6 = ?$	$5 + 7 = ?$	$14 - 7 = ?$	$\frac{1}{2}$ of 14 = ?

Practice adding:

5. $\begin{array}{r} 2 \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 1 \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 7 \\ \hline \end{array}$	6. $\begin{array}{r} 7 \\ 0 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 6 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 7 \\ \hline \end{array}$
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In adding 5, 2, 4, say: 7, 11. Practice adding:

7. $\begin{array}{r} 4 \\ 2 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 1 \\ 6 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ 7 \\ 0 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 2 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 2 \\ 3 \\ \hline \end{array}$	8. $\begin{array}{r} 2 \\ 3 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 5 \\ 2 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 0 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 1 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 4 \\ 3 \\ \hline \end{array}$
---------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	---------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------

In subtracting 7 from 12, give the answer only; say 5.

Practice subtracting:

9.	13	11	9	14	13	10	12	11	12
	<u>7</u>	<u>4</u>	<u>7</u>	<u>7</u>	<u>6</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>5</u>

10. Choose from this list of cardboard toys and make statements like this: A 7-cent toy ship and a 4-cent toy cannon cost 11 cents.

The sign for cents is ¢.

Toy ship, 7¢.

Toy gun, 2¢.

Soldier boy, 5¢.

Toy engine, 6¢.

Toy flag, 3¢.

Sailor boy, 5¢.

Toy cannon, 4¢.

Toy airship, 7¢.

Aviator, 6¢.

### 15. Practice with the Number Eight

To play the game in Exercise 13 with the number eight, first find and learn the answers to these questions:

1. $8 + 0 = ?$	2. $8 + 8 = ?$	3. $9 - 8 = ?$	4. $2 \text{ 8's} = ?$
$8 + 1 = ?$	$2 + 8 = ?$	$12 - 8 = ?$	$2 \times 8 = ?$
$8 + 2 = ?$	$1 + 8 = ?$	$11 - 8 = ?$	$1 \times 8 = ?$
$8 + 3 = ?$	$3 + 8 = ?$	$10 - 8 = ?$	$0 \times 8 = ?$
$8 + 4 = ?$	$6 + 8 = ?$	$14 - 8 = ?$	$8 \times 1 = ?$
$8 + 5 = ?$	$4 + 8 = ?$	$13 - 8 = ?$	$8 \times 0 = ?$
$8 + 6 = ?$	$5 + 8 = ?$	$16 - 8 = ?$	$8 \times 2 = ?$
$8 + 7 = ?$	$7 + 8 = ?$	$15 - 8 = ?$	$\frac{1}{2} \text{ of } 16 = ?$

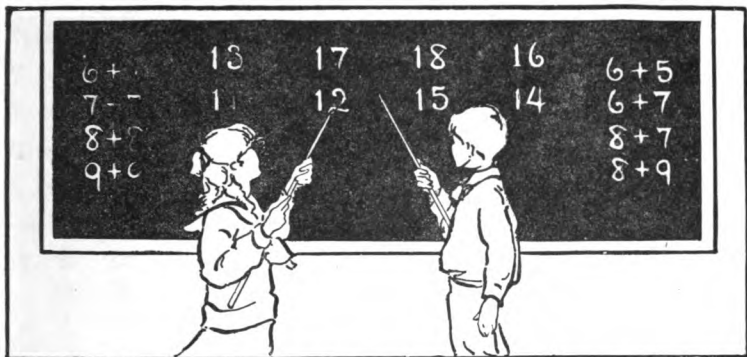
Practice adding:

5.	4	1	5	3	7	8	8	8	8
	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>8</u>	<u>7</u>

Practice subtracting:

6.	11	9	12	8	13	7.	16	15	12	15	13
	<u>8</u>	<u>8</u>	<u>4</u>	<u>8</u>	<u>8</u>		<u>8</u>	<u>8</u>	<u>8</u>	<u>7</u>	<u>5</u>

### 16. A Number Race <sup>1</sup>



The children in this picture are having a number race. Their classmates are taking turns in asking for the sums of the numbers that you see written on the blackboard in tables. As a sum is called for, each of the two children tries to be the first to touch the right number with his pointer.

If you would like to play this game, first copy and complete these problems. Make sure that you know the sums.

$6 + 6 = \text{—}$	$7 + 7 = \text{—}$	$8 + 8 = \text{—}$	$9 + 9 = \text{—}$
$6 + 5 = \text{—}$	$7 + 6 = \text{—}$	$8 + 7 = \text{—}$	$9 + 8 = \text{—}$
$6 + 7 = \text{—}$	$7 + 8 = \text{—}$	$8 + 9 = \text{—}$	$9 + 10 = \text{—}$

<sup>1</sup> To make this game a class contest, divide the class into two sections, calling one the Reds and the other the Blues. Choose a child from each side as a contestant, and a third child for score keeper. The two children chosen as contestants continue to race until every child in one row of seats has had a chance to ask for a sum, after which one point is counted on the score for the side of the child winning the greatest number of answers; then two new contestants are chosen. This is a favorite game with children.



## 17. Practice with the Number Nine

To play the game in Exercise 16 with the number nine, first find and learn the answers to these questions.

1.  $9 + 0 = ?$    2.  $9 + 9 = ?$    3.  $11 - 9 = ?$    4.  $2 \text{ 9's} = ?$   
 $9 + 1 = ?$     $2 + 9 = ?$     $14 - 9 = ?$     $2 \times 9 = ?$   
 $9 + 2 = ?$     $4 + 9 = ?$     $12 - 9 = ?$     $1 \times 9 = ?$   
 $9 + 3 = ?$     $3 + 9 = ?$     $10 - 9 = ?$     $0 \times 9 = ?$   
 $9 + 4 = ?$     $1 + 9 = ?$     $13 - 9 = ?$     $9 \times 1 = ?$   
 $9 + 5 = ?$     $5 + 9 = ?$     $15 - 9 = ?$     $9 \times 0 = ?$   
 $9 + 6 = ?$     $7 + 9 = ?$     $18 - 9 = ?$     $9 \times 2 = ?$   
 $9 + 7 = ?$     $6 + 9 = ?$     $17 - 9 = ?$     $\frac{1}{2} \text{ of } 18 = ?$   
 $9 + 8 = ?$     $8 + 9 = ?$     $16 - 9 = ?$

Practice adding:

5.  $\begin{array}{r} 9 \\ 4 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 7 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 5 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 8 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 6 \\ \hline \end{array}$    6.  $\begin{array}{r} 0 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 3 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 2 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 8 \\ 9 \\ \hline \end{array}$
7.  $\begin{array}{r} 2 \\ 5 \\ 4 \\ \hline \end{array}$     $\begin{array}{r} 3 \\ 6 \\ 3 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 0 \\ 7 \\ \hline \end{array}$     $\begin{array}{r} 4 \\ 5 \\ 4 \\ \hline \end{array}$     $\begin{array}{r} 5 \\ 4 \\ 5 \\ \hline \end{array}$    8.  $\begin{array}{r} 9 \\ 2 \\ 3 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 4 \\ 4 \\ \hline \end{array}$     $\begin{array}{r} 7 \\ 3 \\ 6 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 4 \\ 5 \\ \hline \end{array}$     $\begin{array}{r} 9 \\ 4 \\ 3 \\ \hline \end{array}$

Practice subtracting:

9.  $\begin{array}{r} 11 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 10 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 12 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 14 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 13 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 17 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 16 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 15 \\ 9 \\ \hline \end{array}$     $\begin{array}{r} 18 \\ 9 \\ \hline \end{array}$

10. Make other statements like this: If I have 9 cents and earn 5 cents, I would have 14 cents.

11. Make statements like this one: Ruth has 9 cents. To buy a book for 15 cents, she needs 6 cents more.

18. Review of Addition Facts <sup>1</sup>

To add well, you must know the sums of the numbers below. Practice giving those in each group until you know them.

## I. Add:

$$\begin{array}{r} 1. \quad 1 \quad 2 \quad 1 \quad 1 \quad 0 \quad 3 \\ \quad \quad 2 \quad 2 \quad 1 \quad 0 \quad 2 \quad 0 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 1 \quad 3 \quad 4 \quad 3 \quad 1 \quad 4 \\ \quad \quad 3 \quad 2 \quad 0 \quad 3 \quad 4 \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 2 \quad 4 \quad 5 \quad 3 \quad 4 \quad 6 \\ \quad \quad 3 \quad 2 \quad 1 \quad 4 \quad 4 \quad 1 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 0 \quad 5 \quad 6 \quad 2 \quad 5 \quad 5 \\ \quad \quad 5 \quad 2 \quad 3 \quad 6 \quad 4 \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 6 \quad 6 \quad 4 \quad 6 \quad 2 \quad 5 \\ \quad \quad 0 \quad 5 \quad 6 \quad 2 \quad 5 \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 3 \quad 6 \quad 4 \quad 5 \quad 3 \quad 6 \\ \quad \quad 6 \quad 4 \quad 5 \quad 6 \quad 5 \quad 6 \\ \hline \end{array}$$

## II. Add:

$$\begin{array}{r} 7. \quad 2 \quad 3 \quad 0 \quad 7 \quad 4 \quad 3 \\ \quad \quad 7 \quad 9 \quad 8 \quad 3 \quad 9 \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 9 \quad 7 \quad 9 \quad 1 \quad 9 \quad 8 \\ \quad \quad 1 \quad 0 \quad 0 \quad 8 \quad 3 \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 9 \quad 7 \quad 2 \quad 0 \quad 3 \quad 4 \\ \quad \quad 2 \quad 1 \quad 8 \quad 7 \quad 7 \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 7 \quad 8 \quad 1 \quad 0 \quad 4 \quad 2 \\ \quad \quad 2 \quad 3 \quad 9 \quad 9 \quad 8 \quad 9 \\ \hline \end{array}$$

## III. Add:

$$\begin{array}{r} 11. \quad 5 \quad 9 \quad 7 \quad 7 \quad 6 \quad 7 \\ \quad \quad 8 \quad 6 \quad 7 \quad 5 \quad 9 \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 8 \quad 6 \quad 8 \quad 8 \quad 9 \quad 9 \\ \quad \quad 6 \quad 7 \quad 4 \quad 8 \quad 5 \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 5 \quad 6 \quad 8 \quad 7 \quad 8 \quad 5 \\ \quad \quad 7 \quad 8 \quad 9 \quad 8 \quad 5 \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 7 \quad 9 \quad 7 \quad 9 \quad 9 \quad 8 \\ \quad \quad 6 \quad 9 \quad 4 \quad 8 \quad 4 \quad 7 \\ \hline \end{array}$$

<sup>1</sup> For mastering these facts it will be found helpful to use flash cards (see page 62), also to give much practice in short column addition.

## 19. Review of Subtraction Facts

To subtract, you must know the differences in these numbers. Practice subtracting the numbers in each exercise until you know the answers.<sup>1</sup>

## I. Subtract:

$$\begin{array}{r} 1. \quad 3 \quad 4 \quad 2 \quad 1 \quad 2 \quad 3 \\ \quad \underline{2} \quad \underline{2} \quad \underline{1} \quad \underline{0} \quad \underline{2} \quad \underline{0} \end{array}$$

$$\begin{array}{r} 2. \quad 4 \quad 5 \quad 4 \quad 6 \quad 5 \quad 7 \\ \quad \underline{3} \quad \underline{2} \quad \underline{0} \quad \underline{3} \quad \underline{4} \quad \underline{3} \end{array}$$

$$\begin{array}{r} 3. \quad 5 \quad 6 \quad 6 \quad 7 \quad 8 \quad 7 \\ \quad \underline{3} \quad \underline{2} \quad \underline{1} \quad \underline{4} \quad \underline{4} \quad \underline{1} \end{array}$$

$$\begin{array}{r} 4. \quad 5 \quad 7 \quad 9 \quad 8 \quad 9 \quad 10 \\ \quad \underline{5} \quad \underline{2} \quad \underline{3} \quad \underline{6} \quad \underline{4} \quad \underline{5} \end{array}$$

$$\begin{array}{r} 5. \quad 6 \quad 11 \quad 10 \quad 8 \quad 7 \quad 8 \\ \quad \underline{0} \quad \underline{5} \quad \underline{6} \quad \underline{2} \quad \underline{5} \quad \underline{3} \end{array}$$

$$\begin{array}{r} 6. \quad 9 \quad 10 \quad 9 \quad 11 \quad 8 \quad 12 \\ \quad \underline{6} \quad \underline{4} \quad \underline{5} \quad \underline{6} \quad \underline{5} \quad \underline{6} \end{array}$$

## II. Subtract:

$$\begin{array}{r} 7. \quad 9 \quad 12 \quad 8 \quad 10 \quad 13 \quad 11 \\ \quad \underline{7} \quad \underline{9} \quad \underline{8} \quad \underline{3} \quad \underline{9} \quad \underline{8} \end{array}$$

$$\begin{array}{r} 8. \quad 10 \quad 7 \quad 9 \quad 9 \quad 12 \quad 10 \\ \quad \underline{1} \quad \underline{0} \quad \underline{0} \quad \underline{8} \quad \underline{3} \quad \underline{2} \end{array}$$

$$\begin{array}{r} 9. \quad 11 \quad 8 \quad 10 \quad 7 \quad 10 \quad 11 \\ \quad \underline{2} \quad \underline{1} \quad \underline{8} \quad \underline{7} \quad \underline{7} \quad \underline{7} \end{array}$$

$$\begin{array}{r} 10. \quad 9 \quad 11 \quad 10 \quad 9 \quad 12 \quad 11 \\ \quad \underline{2} \quad \underline{3} \quad \underline{9} \quad \underline{9} \quad \underline{8} \quad \underline{9} \end{array}$$

## III. Subtract:

$$\begin{array}{r} 11. \quad 13 \quad 15 \quad 14 \quad 12 \quad 15 \quad 16 \\ \quad \underline{8} \quad \underline{6} \quad \underline{7} \quad \underline{5} \quad \underline{9} \quad \underline{9} \end{array}$$

$$\begin{array}{r} 12. \quad 14 \quad 13 \quad 12 \quad 16 \quad 14 \quad 16 \\ \quad \underline{6} \quad \underline{7} \quad \underline{4} \quad \underline{8} \quad \underline{5} \quad \underline{7} \end{array}$$

$$\begin{array}{r} 13. \quad 12 \quad 14 \quad 17 \quad 15 \quad 13 \quad 14 \\ \quad \underline{7} \quad \underline{8} \quad \underline{9} \quad \underline{8} \quad \underline{5} \quad \underline{9} \end{array}$$

$$\begin{array}{r} 14. \quad 13 \quad 18 \quad 11 \quad 17 \quad 13 \quad 15 \\ \quad \underline{6} \quad \underline{9} \quad \underline{4} \quad \underline{8} \quad \underline{4} \quad \underline{7} \end{array}$$

<sup>1</sup> Exercises 18 and 19 are made self-testing for written work. The first addends in the problems in Exercise 18 correspond to the differences for this page. The minuends above correspond to the sums on the preceding page.

**20. Practice in Multiplication and Division**

Find answers:

- |                |                     |                      |                              |
|----------------|---------------------|----------------------|------------------------------|
| 1. $6 + 6 = ?$ | 2. $2 \times 6 = ?$ | 3. $2 \times ? = 12$ | 4. $\frac{1}{2}$ of $12 = ?$ |
| $7 + 7 = ?$    | $2 \times 7 = ?$    | $2 \times ? = 16$    | $\frac{1}{2}$ of $16 = ?$    |
| $8 + 8 = ?$    | $2 \times 8 = ?$    | $2 \times ? = 14$    | $\frac{1}{2}$ of $14 = ?$    |
| $9 + 9 = ?$    | $2 \times 9 = ?$    | $2 \times ? = 18$    | $\frac{1}{2}$ of $18 = ?$    |
- 
- |                    |                     |                      |                              |
|--------------------|---------------------|----------------------|------------------------------|
| 5. $4 + 4 + 4 = ?$ | 6. $3 \times 4 = ?$ | 7. $3 \times ? = 15$ | 8. $\frac{1}{3}$ of $15 = ?$ |
| $5 + 5 + 5 = ?$    | $3 \times 5 = ?$    | $3 \times ? = 12$    | $\frac{1}{3}$ of $12 = ?$    |
| $6 + 6 + 6 = ?$    | $3 \times 6 = ?$    | $3 \times ? = 18$    | $\frac{1}{3}$ of $18 = ?$    |
- 
- |                        |                      |                       |                               |
|------------------------|----------------------|-----------------------|-------------------------------|
| 9. $3 + 3 + 3 + 3 = ?$ | 10. $4 \times 3 = ?$ | 11. $4 \times ? = 16$ | 12. $\frac{1}{4}$ of $16 = ?$ |
| $4 + 4 + 4 + 4 = ?$    | $4 \times 4 = ?$     | $4 \times ? = 20$     | $\frac{1}{4}$ of $20 = ?$     |
| $5 + 5 + 5 + 5 = ?$    | $4 \times 5 = ?$     | $4 \times ? = 12$     | $\frac{1}{4}$ of $12 = ?$     |

**21. Problem Review**

**I. PLAYTIME**

1. Helen and Mary had a tea party for their dolls. Helen had 5 dolls at the party, and Mary had 4. How many dolls were there?

2. Helen set the table with  $\frac{1}{2}$  dozen plates of one kind and 3 plates of another kind. How many plates did she use?

3. Six of the dolls had chairs. The rest had to sit on boxes. How many dolls had to sit on boxes?



4. Tom and Fred had a play circus in Tom's back yard. There were 6 boys who took part in the circus and 7 who looked on. How many boys were there? •

5. Five boys left the circus ground. How many were still there?

6. There were 8 boys on one side in a snowball match and 7 on the other. How many boys were in the match?

7. In a game of hide-and-seek 14 children hid. Out of this number 7 were caught. How many were still hiding?

8. Make other problems about boys and girls having good times.

## II. DOING ERRANDS

1. Helen bought for her mother a cake of yeast at 2 cents. How much was left from 10 cents?

2. Tom bought for his father 5 postal cards at 1 cent apiece and 3 stamps at 2 cents apiece. How much money did he spend?

3. How much money is needed to buy a pint of milk at 8 cents and a bar of chocolate at 7 cents?

4. How much is left from 15 cents after paying for a bottle of ink at 5 cents and a pen at 3 cents?

5. Mary had 12 cents with which to buy a box of crackers for 7 cents and some candy. How much money did she have for the candy?

6. Fred was sent to buy  $\frac{1}{2}$  a pound of cookies at 16¢ a pound. How much money did he need?

## III. VISITING ON A FARM

Tom, Fred, and Mary were visiting on a farm.

1. One afternoon they went for the cows. They found 7 in the meadow lot and 8 in the wood lot. How many did they find to drive home?

2. One morning Fred and his grandfather went up to the pasture to look after the calves. There were 12 in the field. They drove 7 home. How many were left?



3. One day the children all went berrying, taking their lunch with them. In the morning they picked 7 quarts of berries, and in the afternoon 6 quarts. How many quarts did they pick?

4. The best fun that the children had was finding the eggs. They kept a record day by day of the number that each found.

The first day Tom found 5 eggs, Fred 8, and Mary 7.

The second day Tom found 8 eggs, Fred 7, and Mary 4.

The third day Tom found 6 eggs, Fred 5, and Mary 7.

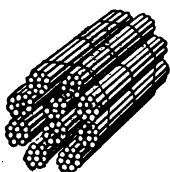
How many eggs were found the first day? The second day? The third day?

5. Which one of the children found the most eggs?

## CHAPTER II. NUMBERS OF TWO AND THREE FIGURES

### 22. Counting to One Hundred

10 ten	20 twenty	30 thirty	40 forty	50 fifty
60 sixty	70 seventy	80 eighty	90 ninety	100 one hundred



One Hundred

1. How many bundles of ten sticks each does it take to make a hundred?

2. How many tens make one hundred?

3. In playing hide-and-seek, boys and girls sometimes count to one hundred by tens. Tell what they say.

4. How many are 2 tens? 3 tens? 4 tens? 5 tens? 6 tens? 7 tens? 8 tens? 9 tens? 10 tens?

5. Fill blanks:

20 (twenty) equals — tens.

60 (sixty) equals — tens.

30 (thirty) equals — tens.

70 (seventy) equals — tens.

40 (forty) equals — tens.

80 (eighty) equals — tens.

50 (fifty) equals — tens.

90 (ninety) equals — tens.

100 (one hundred) equals — tens.

6. Complete this table, first orally, then by writing:

A COUNTING TABLE

0	10	20	30	40	50	60	70	80	90
1	11	21							
2	12	22							
3	13								
4	14								
5	15								
6	16								
7	17								
8	18								
9	19								

### 23. Units and Tens

A unit is one.

1. How many units are there in the number 3? In 5? In 7?

2. How many units equal 1 ten?

$$13 = \text{10 units and 3 units}$$

3. How many tens and units in 13?

$$24 = \text{2 tens and 4 units}$$

4. How many tens and units in 24?

5. Show with sticks how many tens and units in 12. In 21. In 33. In 42.

6. Fill blanks:

$$14 = \text{— ten and — units.}$$

$$19 = \text{— ten and — units.}$$

$$16 = \text{— ten and — units.}$$

$$27 = \text{— tens and — units.}$$

$$45 = \text{— tens and — units.}$$



7. Read these numbers and tell the number of tens and units in each:

14	23	40	64	80	66	34
17	25	42	67	86	88	49
16	32	56	72	94	43	87
18	38	59	77	97	90	99

8. Write in figures:

twenty	sixteen	ninety-three	fifty-two
seventy	forty-five	sixty-seven	eighty-six

9. Write in words:

19	27	34	46	58	63	71	85	92	69	78
----	----	----	----	----	----	----	----	----	----	----

10. Write the number that means:

1 ten 5 units	8 tens 8 units	2 tens 7 units
4 tens 3 units	5 tens 0 units	4 tens 1 unit
7 tens 5 units	6 tens 3 units	9 tens 0 units

## 24. The Number Two in Addition and Subtraction<sup>1</sup>

Add:

1.	1	41	31	2	12	52	3	63	73
	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>
2.	4	14	34	5	25	95	6	46	86
	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>

<sup>1</sup> Pupils should note that having learned to add 2 to 1 they can readily add 2 to any number ending in 1, as 11, 21, 31, 41, 81, 101; for the right-hand digit will always be 3. See that they master this principle of adding or subtracting by endings, as illustrated in this exercise.

3.	$\begin{array}{r} 7 \\ 2 \end{array}$	$\begin{array}{r} 37 \\ 2 \end{array}$	$\begin{array}{r} 77 \\ 2 \end{array}$		$\begin{array}{r} 8 \\ 2 \end{array}$	$\begin{array}{r} 28 \\ 2 \end{array}$	$\begin{array}{r} 38 \\ 2 \end{array}$		$\begin{array}{r} 9 \\ 2 \end{array}$	$\begin{array}{r} 19 \\ 2 \end{array}$	$\begin{array}{r} 49 \\ 2 \end{array}$
----	---------------------------------------	----------------------------------------	----------------------------------------	--	---------------------------------------	----------------------------------------	----------------------------------------	--	---------------------------------------	----------------------------------------	----------------------------------------

4.	$\begin{array}{r} 51 \\ 2 \end{array}$	$\begin{array}{r} 82 \\ 2 \end{array}$	$\begin{array}{r} 43 \\ 2 \end{array}$		$\begin{array}{r} 74 \\ 2 \end{array}$	$\begin{array}{r} 35 \\ 2 \end{array}$	$\begin{array}{r} 26 \\ 2 \end{array}$		$\begin{array}{r} 57 \\ 2 \end{array}$	$\begin{array}{r} 88 \\ 2 \end{array}$	$\begin{array}{r} 39 \\ 2 \end{array}$
----	----------------------------------------	----------------------------------------	----------------------------------------	--	----------------------------------------	----------------------------------------	----------------------------------------	--	----------------------------------------	----------------------------------------	----------------------------------------

Subtract:

5.	$3-2=?$	$4-2=?$	$5-2=?$	$6-2=?$
	$13-2=?$	$14-2=?$	$15-2=?$	$16-2=?$
	$43-2=?$	$84-2=?$	$95-2=?$	$46-2=?$
6.	$7-2=?$	$8-2=?$	$9-2=?$	$10-2=?$
	$17-2=?$	$18-2=?$	$19-2=?$	$20-2=?$
	$27-2=?$	$48-2=?$	$59-2=?$	$40-2=?$
	$47-2=?$	$68-2=?$	$99-2=?$	$80-2=?$

## 25. The Number Two in Multiplication and Division<sup>1</sup>

### I

1. How many are 2 and 2 and 2 and 2? How many is 4 times 2? Which is the easier way of finding how many 4 twos are?

To save time in getting answers, we learn tables called **multiplication tables**.

<sup>1</sup> Many children who learn the facts in multiplication as parts of tables instead of as individual facts form the habit of reciting an entire table whenever they try to recall a single fact. To avoid the formation of this habit, it will be found helpful, after once building a table for the sake of the rhythm of the numbers, to have the greater part of the practice work on the facts out of order. The games on pages 15, 17, 62, 89 of Part One are easily adapted to this work. As soon as pupils have been taught the multiplication process, problems should be used with the table drill (see page 65, Exercise 12).

To build the table of twos, practice counting by twos.

2. First, ask all of your classmates sitting in one row of seats to hold up both hands. Walk down the aisle, counting the hands by twos.

3. Next, arrange your classmates two abreast for a march. Count them by twos.

4. Practice giving answers:

1 two is —.	7 twos are —.	$1 \times 2 = ?$	$7 \times 2 = ?$
2 twos are —.	8 twos are —.	$3 \times 2 = ?$	$9 \times 2 = ?$
3 twos are —.	9 twos are —.	$2 \times 2 = ?$	$8 \times 2 = ?$
4 twos are —.	10 twos are —.	$4 \times 2 = ?$	$11 \times 2 = ?$
5 twos are —.	11 twos are —.	$6 \times 2 = ?$	$10 \times 2 = ?$
6 twos are —.	12 twos are —.	$5 \times 2 = ?$	$12 \times 2 = ?$

5. Play you are mailing letters. At 2 cents each, what is the cost of stamps for 2 letters? For 4 letters? For 3 letters?

6. Play you are buying fruit. At 2 cents each, what must you pay for 5 apples? For 6 peaches? For 8 plums? For 12 bananas?

## II

1. Arrange 6 pencils in groups of twos. How many twos in 6? 6 divided by 2 is how many?

2. Arrange 8 pencils in groups of twos. How many twos in 8? 8 divided by 2 is how many?

3. Find how many twos in 4. In 10. In 12.

The sign  $\div$  is read divided by.

4. $6 \div 2 = ?$	$2 \div 2 = ?$	$10 \div 2 = ?$
$4 \div 2 = ?$	$8 \div 2 = ?$	$12 \div 2 = ?$

The problem  $6 \div 2 = ?$  may be written also in this form:  
 $2 \overline{)6}$ . The question asked is, "How many 2's in 6?"

The answer, 3, is written above the 6 in this way:  $\begin{array}{r} 3 \\ 2 \overline{)6} \end{array}$

5. Find the answers:

$2 \overline{)4}$	$2 \overline{)8}$	$2 \overline{)2}$	$2 \overline{)10}$	$2 \overline{)12}$
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6. How many pairs of gloves are 4 gloves made to match?  
 How many pairs are 6 gloves?

7. How many pairs of shoes are 8 shoes made to match?  
 10 shoes? 12 shoes?

8. Find the missing numbers:

$? \times 2 = 14$	$? \times 2 = 20$	$? \times 2 = 18$
$14 \div 2 = ?$	$20 \div 2 = ?$	$18 \div 2 = ?$
$? \times 2 = 16$	$? \times 2 = 22$	$? \times 2 = 24$
$16 \div 2 = ?$	$22 \div 2 = ?$	$4 \div 2 = ?$

$2 \overline{)14}$	$2 \overline{)18}$	$2 \overline{)16}$	$2 \overline{)22}$	$2 \overline{)20}$	$2 \overline{)24}$
--------------------	--------------------	--------------------	--------------------	--------------------	--------------------

9. At 2 cents each, how many pencils can be bought for  
 20 cents? For 24 cents?

10. How many 2-cent postage stamps can be bought for  
 16 cents? For 22 cents?

11. Make other problems about buying 2-cent pencils.

12. Make problems about buying 2-cent postage stamps.

**26. The Number Three in Addition and Subtraction.****A CARD GAME<sup>1</sup>**

A number is chosen to be added to or subtracted from each number on the cards below. The children stand near their desks, one row at a time. The teacher holds the cards and, as she exposes them to view, calls upon each child in turn to add the number chosen to each of the two numbers on the card, or to subtract it from each. If a child's work is correct, he takes his seat; but if he fails, he must stand until he has given the correct answer when another child fails.

To play this game with the number 3, first study the cards below in this way: Add 3 to each number; then subtract 3 from each.

3    13	4    14	6    16	5    15
7    17	9    19	8    18	11   21
12   22	10   20	3    73	4    34
7    67	5    45	6    86	9    79
8    38	11   51	10   90	12   62

**27. The Number Three in Multiplication and Division**

1. Count out 18 pencils by threes.<sup>2</sup>
2. Count out 36 pieces of chalk by threes.

<sup>1</sup> To make this game a contest, count the number of correct answers for each row of children, writing the score on the blackboard.

<sup>2</sup> See footnote, page 27.

3. Complete:

- 1 three is —.      7 threes are —.       $3 \times 3 = ?$        $7 \times 3 = ?$   
 2 threes are —.      8 threes are —.       $2 \times 3 = ?$        $10 \times 3 = ?$   
 3 threes are —.      9 threes are —.       $4 \times 3 = ?$        $8 \times 3 = ?$   
 4 threes are —.      10 threes are —.       $1 \times 3 = ?$        $11 \times 3 = ?$   
 5 threes are —.      11 threes are —.       $5 \times 3 = ?$        $9 \times 3 = ?$   
 6 threes are —.      12 threes are —.       $6 \times 3 = ?$        $12 \times 3 = ?$

4. Play you are buying flowers. At 3 cents each, how much must you pay for 4 roses? For 6 carnations? For 5 water-lilies?

5. Play you are at a seed store. At 3 cents a package, how much must you pay for 10 packages of seed? For 12 packages?

6. Make problems about buying pansy plants at 3 cents apiece.

7. Find the missing numbers:

- |                   |                 |                   |                 |
|-------------------|-----------------|-------------------|-----------------|
| $? \times 3 = 3$  | $3 \div 3 = ?$  | $? \times 3 = 18$ | $18 \div 3 = ?$ |
| $? \times 3 = 9$  | $9 \div 3 = ?$  | $? \times 3 = 24$ | $24 \div 3 = ?$ |
| $? \times 3 = 6$  | $6 \div 3 = ?$  | $? \times 3 = 21$ | $21 \div 3 = ?$ |
| $? \times 3 = 12$ | $12 \div 3 = ?$ | $? \times 3 = 33$ | $33 \div 3 = ?$ |
| $? \times 3 = 18$ | $18 \div 3 = ?$ | $? \times 3 = 30$ | $30 \div 3 = ?$ |
| $? \times 3 = 15$ | $15 \div 3 = ?$ | $? \times 3 = 36$ | $36 \div 3 = ?$ |

8. Find the answers:

$3 \overline{)15}$        $3 \overline{)21}$        $3 \overline{)18}$        $3 \overline{)27}$        $3 \overline{)33}$        $3 \overline{)36}$

9. Play you are at a book store. At 3 cents apiece, how many pencils can you buy for 6 cents? For 12 cents?

10. Rulers are selling for 3 cents. How many can you buy for 15 cents?

11. At 3 cents apiece, what must you pay for 4 pens? For 3 notebooks? For 12 sheets of cardboard?

12. Helen has 10 cents. She buys 3 blotters at 3 cents apiece. How much change should she receive?

13. John has 20 cents. How many postal cards can he buy at 3 cents apiece? How much change should he receive?

### 28. Review

1.  $22 + 2 = ?$     2.  $17 - 2 = ?$     3.  $25 + 3 = ?$     4.  $46 - 3 = ?$

$15 + 2 = ?$      $29 - 2 = ?$      $36 + 3 = ?$      $27 - 3 = ?$

$34 + 2 = ?$      $50 - 2 = ?$      $58 + 3 = ?$      $81 - 3 = ?$

$78 + 2 = ?$      $65 - 2 = ?$      $87 + 3 = ?$      $92 - 3 = ?$

$69 + 2 = ?$      $81 - 2 = ?$      $49 + 3 = ?$      $60 - 3 = ?$

5.  $4 \times 2 = ?$     6.  $8 \div 2 = ?$     7.  $3 \times 3 = ?$     8.  $6 \div 3 = ?$

$7 \times 2 = ?$      $10 \div 2 = ?$      $4 \times 3 = ?$      $15 \div 3 = ?$

$6 \times 2 = ?$      $14 \div 2 = ?$      $7 \times 3 = ?$      $9 \div 3 = ?$

$10 \times 2 = ?$      $\frac{1}{2}$  of 18 = ?     $9 \times 3 = ?$      $\frac{1}{3}$  of 18 = ?

$12 \times 2 = ?$      $\frac{1}{2}$  of 24 = ?     $12 \times 3 = ?$      $\frac{1}{3}$  of 24 = ?

### 29. Measuring Heights and Lengths <sup>1</sup>

1. How can you find how many inches that you grow in height between two birthdays?

<sup>1</sup> In connection with this work, it will be found helpful, in training children in the perception of distances, to have them make estimates before measuring.

2. How can you find the difference in height between two classmates without having them stand side by side?

3. Mark your height with chalk in a doorway. Measure it with a foot rule.

4. Measure the height of the tallest boy in your class and then of the shortest boy. Measure the difference in their heights.

5. Measure the difference in the heights of the tallest and the shortest girls.



6. Cut a piece of string<sup>1</sup> the width of your schoolroom. Cut another the length of your schoolroom. Measure each string with a foot rule.

7. Write sentences like this: Our schoolroom is 24 feet, 3 inches long.

8. Measure the strings with a yard stick. Write sentences like this: Our schoolroom is 8 yards, 3 inches long.

9. See how many foot rules you can lay end to end along a yard stick.

10. Draw a line on the blackboard, 1 yard long. Divide it into feet.

11. Draw a line 1 foot long. Divide it into inches.

<sup>1</sup> String that is not elastic should be used for this purpose.



12. Learn this table:

$$\begin{array}{rcl} 12 \text{ inches (in.)} & = & 1 \text{ foot (ft.)} \\ 3 \text{ feet} & = & 1 \text{ yard (yd.)} \end{array}$$

13. How many inches are there in  $\frac{1}{2}$  foot? In  $\frac{1}{3}$  of a foot? In  $\frac{1}{4}$  of a foot?

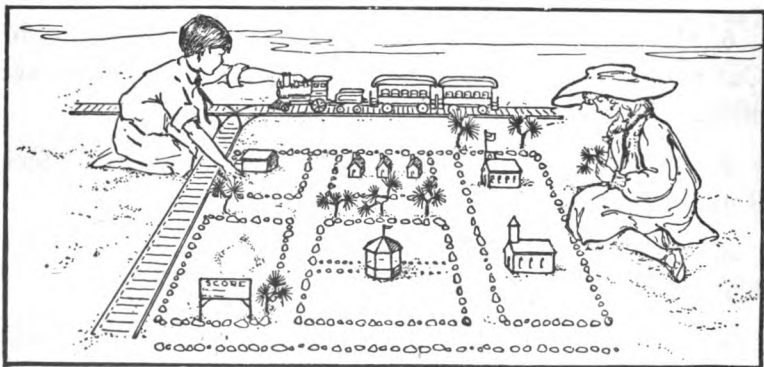
14. How many feet are there in 6 yards? In 9 yards?

15. How many yards are there in 24 feet?

16. A schoolroom is 30 feet long. How many yards long is it?

17. A hall is 12 yards long. How many feet long is it?

### 30. Measurements in Pebble Town



While at the seashore, Denison and Harriet made a village of pebbles like the one you see in the picture. They used twigs for trees, and pieces of wood for houses.

Find the distance in feet around each block:

1. The village park was a square, one yard on each side.

2. The ball grounds were 2 feet wide and 3 feet long.
3. The block containing the railway station was a square, 2 feet on each side.
4. The block containing the three houses was 2 feet wide and 1 yard long.
5. The block containing the schoolhouse and the church was 2 feet wide and 2 yards long.
6. The longest street was 9 feet long. What was its length in yards?
7. The railway track was 5 yards and 2 feet long. What was its length in feet?
8. Make a plan for a play-village of your own. First decide what the measurements are to be.
9. Ask and answer questions about the plan for your own play-village.

### 31. Numbers of Three Figures

100 = one hundred.	500 = five hundred.
200 = two hundred.	600 = six hundred.
300 = three hundred.	700 = seven hundred.
400 = four hundred.	800 = eight hundred.
900 = nine hundred.	

1. Tie sticks into bundles of tens, and the bundles of tens into bundles of hundreds.
2. Show with the sticks what is meant by one hundred. By two hundred. By one hundred ten. By two hundred three. By one hundred twenty. By two hundred thirty-five.

One hundred ten is written 110.

Two hundred three is written 203.

One hundred twenty is written 120.

Two hundred thirty-five is written 235.

3. Read these numbers:

200	123	430	304	213	641
700	142	220	808	404	708
300	249	640	207	840	290
500	768	370	905	309	584
900	356	160	506	570	624
800	225	980	709	809	307

4. Write in figures:

four hundred	seven hundred thirty-three
seven hundred	two hundred twenty-two
five hundred	five hundred twenty-one
nine hundred	four hundred forty-five
eight hundred	six hundred seventy-three
three hundred three	four hundred fifty
five hundred four	six hundred thirty

### 32. The Game of Units, Tens, and Hundreds

This game is played with bundles of sticks to stand for tens and hundreds, and loose sticks to stand for units. A pupil chooses a number like 243, and with his back to the class takes sticks to show the units, tens, and hundreds in the number. He then holds the sticks before his classmates a moment. The first child to name the correct number is allowed to write it on the blackboard and then to build another number for the class to name.

Fill blanks:

1. 354 equals — units, — tens, — hundreds.
2. 243 equals — units, — tens, — hundreds.
3. 528 equals — units, — tens, — hundreds.
4. 765 equals — units, — tens, — hundreds.
5. 892 equals — units, — tens, — hundreds.
6. 907 equals — units, — tens, — hundreds.
7. 450 equals — units, — tens, — hundreds.
8. 876 equals — units, — tens, — hundreds.

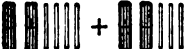
Read these numbers and then tell the number of units, tens, and hundreds in each:

9. 240	10. 642	11. 289	12. 276	13. 879	14. 963
370	345	310	399	688	201
208	763	760	898	950	888
309	945	480	999	507	390

### 33. Children at School

There are 24 boys and 23 girls in a school. How many children are there?

To find how many children there are in the school, the numbers 24 and 23 are added.<sup>1</sup>

 = 4 tens and 7 units, or 47.

24

23

47 Sum

In adding the units or ones, say: 3, 7.

In adding the tens, say: 2, 4.

In giving the answer, say: The sum is 47.

The number of children in the school is 47.

<sup>1</sup> The explanations of processes given throughout this book are intended as helps in making the work clear. The practice of the best teachers is opposed to having pupils themselves analyze the processes after their first introduction.

In adding, begin with the units.

[With pencil.]

1. Add:

24	22	34	40	33	44
<u>31</u>	<u>32</u>	<u>14</u>	<u>23</u>	<u>33</u>	<u>22</u>

2. In Helen's class at school there are 34 children; in Tom's class there are 42 children. How many children are there in the two classes?

3. The children in Margaret's class gave a Christmas party. 42 boys and 32 girls were there. How many children were at the party?

4. At a ball game there were 24 boys from one school and 22 from another. How many boys were at the game?

### 34. Practice in Addition

I

[With pencil.]

Find the sums:

1. 34	2. 42	3. 43	4. 31	5. 45	6. 30
<u>32</u>	<u>21</u>	<u>34</u>	<u>24</u>	<u>54</u>	<u>20</u>
	<u>31</u>		<u>34</u>		<u>40</u>

Find answers by writing the numbers in a column and adding:

- |                        |                        |
|------------------------|------------------------|
| 7. $35 + 22 = ?$       | 13. $44 + 44 = ?$      |
| 8. $42 + 23 = ?$       | 14. $53 + 34 = ?$      |
| 9. $24 + 33 + 40 = ?$  | 15. $33 + 43 + 22 = ?$ |
| 10. $44 + 35 = ?$      | 16. $37 + 42 = ?$      |
| 11. $30 + 23 + 33 = ?$ | 17. $26 + 32 = ?$      |
| 12. $21 + 22 + 45 = ?$ | 18. $34 + 21 + 42 = ?$ |

## II

What is the sum of 323 and 45?

Name the units, tens, and hundreds in 323. In 45.

323

In adding the units, or ones, say: 5, 8.

45

In adding the tens, say: 4, 6.

368

In adding the hundreds, say: 3.

In giving the answer, say: The sum is 368.

For adding, units are written under units, tens under tens, and hundreds under hundreds.

[With pencil]

Find answers:

1.  $421 + 34 = ?$

4.  $344 + 24 = ?$

2.  $123 + 124 = ?$

5.  $214 + 312 + 121 = ?$

3.  $232 + 66 = ?$

6.  $412 + 32 + 24 = ?$

Add, naming the units, tens, and hundreds:

7.  $\begin{array}{r} 42 \\ 35 \\ \hline \end{array}$

8.  $\begin{array}{r} 125 \\ 42 \\ \hline \end{array}$

9.  $\begin{array}{r} 213 \\ 124 \\ \hline \end{array}$

10.  $\begin{array}{r} 412 \\ 204 \\ \hline \end{array}$

11.  $\begin{array}{r} 304 \\ 82 \\ \hline \end{array}$

Add, without naming the units, tens, and hundreds:<sup>1</sup>

12.  $\begin{array}{r} 24 \\ 44 \\ \hline \end{array}$

13.  $\begin{array}{r} 35 \\ 53 \\ \hline \end{array}$

14.  $\begin{array}{r} 235 \\ 43 \\ \hline \end{array}$

15.  $\begin{array}{r} 436 \\ 23 \\ \hline \end{array}$

16.  $\begin{array}{r} 452 \\ 145 \\ \hline \end{array}$

17.  $\begin{array}{r} 23 \\ 31 \\ 35 \\ \hline \end{array}$

18.  $\begin{array}{r} 42 \\ 40 \\ 13 \\ \hline \end{array}$

19.  $\begin{array}{r} 123 \\ 142 \\ 20 \\ \hline \end{array}$

20.  $\begin{array}{r} 230 \\ 102 \\ 35 \\ \hline \end{array}$

21.  $\begin{array}{r} 233 \\ 322 \\ 404 \\ \hline \end{array}$

<sup>1</sup> Pupils should be taught to compute with as few words as possible. To add a column containing 4, 3, 5, 6, the words said should be, "7, 12, 18"; not "4 and 3 are 7, and 5 are 12, and 6 are 18."

## 35. Children in their Gardens

## I

[Without pencil.]

1. Mary found 22 tulips in bloom in her garden. She picked 7. How could she tell how many were left, without counting?

2. How many lilies are left to bloom, if out of 24 lilies 6 are picked?

3. Helen set out 18 geraniums. 5 were frost-bitten and died. How many were left to grow?



4. John has 7 cabbages in one row in his garden and 4 cabbages in another row. How can he find how many more there are in one row than in the other? <sup>1</sup>

5. John's strawberry bed is 14 feet long and 8 feet wide. Explain how to find

the difference between the length and the width of the bed.

6. Margaret found 15 purple pansies in blossom and 6 yellow ones. How many more purple ones did she find than yellow ones?

7. John raised 21 quarts of peas, and Tom 14 quarts. How many more quarts did John raise than Tom?

<sup>1</sup> Subtraction as comparison gives children unusual difficulty. For this reason it will be found helpful to emphasize the idea in oral problems before giving written problems.

## II

Mary finds 148 roses in blossom in her garden and picks  
 36. How many roses does she leave on the bushes?

To find how many roses are left, 36 is taken from 148; that is, the difference between the two numbers is found.

How many units and tens in each number?

148	In taking 6 from 8, say: 2.
36	In taking 3 from 4, say: 1.
<u>112</u>	In taking 0 from 1, say: 1.
Difference	In giving the answer, say: The difference is 112. The number of roses left is 112.

In subtracting, begin with units.

The answer found by subtracting is called the **difference** or **remainder**.

[With pencil.]

1. What is the difference between 86 and 23?
2. Find the difference between 94 and 32. Between 242 and 121. Between 698 and 45.
3. Tom pulled 22 beets from a row in his garden, in which there were 84 beets. How many beets were left to grow?
4. Helen had 156 radishes in her garden. She pulled 24. How many were left?
5. There were 144 cabbages in Frank's garden, and 120 in Tom's. How many more cabbages grew in Frank's garden than in Tom's?

<sup>1</sup> In schools where subtraction is taught as a form of addition the following directions may be given: First say: 6 and 2 are 8. Write the 2. Next say, 3 and 1 are 4. Write the 1. Then say: Naught and 1 are 1. Write the 1. For the answer say: The difference is 112.



**36. Practice in Addition and Subtraction****Add:**

[Use pencil only when needed.]

1. 
$$\begin{array}{r} 42 \\ 22 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 61 \\ 25 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 43 \\ 14 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 81 \\ 18 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 32 \\ 25 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 23 \\ 22 \\ 20 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 24 \\ 21 \\ 32 \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 20 \\ 31 \\ 25 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 22 \\ 42 \\ 21 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 31 \\ 44 \\ 23 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 132 \\ 134 \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 114 \\ 204 \\ \hline \end{array}$$

13. 
$$\begin{array}{r} 342 \\ 420 \\ \hline \end{array}$$

14. 
$$\begin{array}{r} 144 \\ 155 \\ \hline \end{array}$$

15. 
$$\begin{array}{r} 245 \\ 154 \\ \hline \end{array}$$

16. 
$$\begin{array}{r} 121 \\ 132 \\ 242 \\ \hline \end{array}$$

17. 
$$\begin{array}{r} 213 \\ 132 \\ 144 \\ \hline \end{array}$$

18. 
$$\begin{array}{r} 113 \\ 214 \\ 142 \\ \hline \end{array}$$

19. 
$$\begin{array}{r} 313 \\ 142 \\ 402 \\ \hline \end{array}$$

20. 
$$\begin{array}{r} 352 \\ 104 \\ 420 \\ \hline \end{array}$$

**Subtract:**

[Use pencil only when needed.]

21. 
$$\begin{array}{r} 36 \\ 21 \\ \hline \end{array}$$

22. 
$$\begin{array}{r} 84 \\ 22 \\ \hline \end{array}$$

23. 
$$\begin{array}{r} 96 \\ 23 \\ \hline \end{array}$$

24. 
$$\begin{array}{r} 47 \\ 35 \\ \hline \end{array}$$

25. 
$$\begin{array}{r} 77 \\ 34 \\ \hline \end{array}$$

26. 
$$\begin{array}{r} 389 \\ 44 \\ \hline \end{array}$$

27. 
$$\begin{array}{r} 498 \\ 127 \\ \hline \end{array}$$

28. 
$$\begin{array}{r} 799 \\ 103 \\ \hline \end{array}$$

29. 
$$\begin{array}{r} 688 \\ 344 \\ \hline \end{array}$$

30. 
$$\begin{array}{r} 977 \\ 445 \\ \hline \end{array}$$

**37. A Picnic in the Woods**

[Use pencil only when needed.]

1. Tom, Mary, and their schoolmates went for a picnic in the woods. How many children were there, if in all there were 24 boys and 22 girls?



2. In the grove where the children ate their lunch, they counted 32 pine trees and 24 oaks. How many trees did they count?

3. Among the trees they saw 32 gray squirrels and 11 red squirrels. The children saw how many more gray squirrels than red ones?

4. Before lunch, 15 of the boys and 14 of the girls played hide-and-seek. How many children were in the game?

5. After lunch, the boys formed sides and tried to see who could find the largest number of walnuts under the trees. Tom's side found 288 walnuts; and Fred's side, 242. How many more walnuts were found by Tom's side than by Fred's side?

6. The girls formed sides, and tried to see who could find the largest number of yellow leaves. Mary's side found 374; and Helen's side, 362. What was the difference in the numbers?

## 38. The Number Four in Addition and Subtraction

[Without pencil]

Use these numbers first for addition, then for subtraction: <sup>1</sup>

1. 
$$\begin{array}{r} 4 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ \hline \end{array} \quad \begin{array}{r} 24 \\ \hline \end{array}$$

2. 
$$\begin{array}{r} 5 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 7 \\ \hline \end{array} \quad \begin{array}{r} 17 \\ \hline \end{array} \quad \begin{array}{r} 47 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 6 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ \hline \end{array} \quad \begin{array}{r} 36 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 8 \\ \hline \end{array} \quad \begin{array}{r} 18 \\ \hline \end{array} \quad \begin{array}{r} 58 \\ \hline \end{array}$$

6. 
$$\begin{array}{r} 9 \\ \hline \end{array} \quad \begin{array}{r} 19 \\ \hline \end{array} \quad \begin{array}{r} 69 \\ \hline \end{array}$$

7. 
$$\begin{array}{r} 10 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ \hline \end{array} \quad \begin{array}{r} 70 \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 11 \\ \hline \end{array} \quad \begin{array}{r} 21 \\ \hline \end{array} \quad \begin{array}{r} 81 \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 12 \\ \hline \end{array} \quad \begin{array}{r} 22 \\ \hline \end{array} \quad \begin{array}{r} 92 \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 13 \\ \hline \end{array} \quad \begin{array}{r} 23 \\ \hline \end{array} \quad \begin{array}{r} 33 \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 34 \\ \hline \end{array} \quad \begin{array}{r} 74 \\ \hline \end{array} \quad \begin{array}{r} 44 \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 37 \\ \hline \end{array} \quad \begin{array}{r} 67 \\ \hline \end{array} \quad \begin{array}{r} 77 \\ \hline \end{array}$$

13. 
$$\begin{array}{r} 89 \\ \hline \end{array} \quad \begin{array}{r} 59 \\ \hline \end{array} \quad \begin{array}{r} 49 \\ \hline \end{array}$$

14. 
$$\begin{array}{r} 43 \\ \hline \end{array} \quad \begin{array}{r} 63 \\ \hline \end{array} \quad \begin{array}{r} 93 \\ \hline \end{array}$$

15. 
$$\begin{array}{r} 41 \\ \hline \end{array} \quad \begin{array}{r} 51 \\ \hline \end{array} \quad \begin{array}{r} 91 \\ \hline \end{array}$$

16. 
$$\begin{array}{r} 61 \\ \hline \end{array} \quad \begin{array}{r} 53 \\ \hline \end{array} \quad \begin{array}{r} 82 \\ \hline \end{array}$$

17. 
$$\begin{array}{r} 94 \\ \hline \end{array} \quad \begin{array}{r} 75 \\ \hline \end{array} \quad \begin{array}{r} 66 \\ \hline \end{array}$$

18. 
$$\begin{array}{r} 57 \\ \hline \end{array} \quad \begin{array}{r} 88 \\ \hline \end{array} \quad \begin{array}{r} 39 \\ \hline \end{array}$$

19. 
$$\begin{array}{r} 50 \\ \hline \end{array} \quad \begin{array}{r} 62 \\ \hline \end{array} \quad \begin{array}{r} 73 \\ \hline \end{array}$$

20. 
$$\begin{array}{r} 76 \\ \hline \end{array} \quad \begin{array}{r} 84 \\ \hline \end{array} \quad \begin{array}{r} 90 \\ \hline \end{array}$$

21. 
$$\begin{array}{r} 79 \\ \hline \end{array} \quad \begin{array}{r} 38 \\ \hline \end{array} \quad \begin{array}{r} 87 \\ \hline \end{array}$$

<sup>1</sup> Perhaps the chief reason why children are slow in acquiring facility in adding is that, instead of being allowed to master a small number field at a time, they are given the entire range of combinations, and so are forced into the habit of counting while adding. Teachers will find it helpful in all supplementary exercises to follow the plan of this book; namely, (1) to work with one number at a time until all the combinations with it are mastered; and (2) to include in long column addition only those combinations with which the children are familiar. For example, the figure 4 should not be put in a column containing more than two or three figures until the children have mastered the exercise given on this page; the figure 5 should not appear until the children have mastered the exercise on page 53.

Add each column from the bottom up; test answers by adding down:<sup>1</sup>

22.	2	3	4	4	3	4	4	4	4
	3	3	3	2	4	3	3	1	4
	4	4	4	4	2	4	4	4	4
	2	3	4	4	4	2	1	3	4
	4	4	2	1	4	4	4	4	4
	—	—	—	—	—	—	—	—	—

23.	4	3	2	3	3	3	4	4	4
	2	4	4	4	4	4	3	3	4
	3	3	2	2	3	4	2	4	3
	4	4	4	4	4	0	4	4	3
	3	3	2	2	3	4	3	3	4
	2	4	4	3	3	3	2	4	4
	—	—	—	—	—	—	—	—	—

### 39. The Number Four in Multiplication and Division



[Without pencil.]

1. Play you are a blacksmith. Make statements like this: For 2 horses I need 8 horseshoes.

2. Count the horseshoes above by fours.

<sup>1</sup> Pupils should form the habit early of testing answers in addition by reversing the order of addition.

## 3. Practice giving the answers to these tables:

1 four is —.	7 fours are —.	$1 \times 4 = ?$	$7 \times 4 = ?$
2 fours are —.	8 fours are —.	$3 \times 4 = ?$	$10 \times 4 = ?$
3 fours are —.	9 fours are —.	$2 \times 4 = ?$	$8 \times 4 = ?$
4 fours are —.	10 fours are —.	$4 \times 4 = ?$	$11 \times 4 = ?$
5 fours are —.	11 fours are —.	$6 \times 4 = ?$	$9 \times 4 = ?$
6 fours are —.	12 fours are —.	$5 \times 4 = ?$	$12 \times 4 = ?$

## 4. How many horses can be shod with 12 horseshoes?

5. Make a problem about 16 horseshoes. About 20 horseshoes.

## 6. Find the missing numbers:

$? \times 4 = 8$	$8 \div 4 = ?$	$? \times 4 = 28$	$28 \div 4 = ?$
$? \times 4 = 4$	$4 \div 4 = ?$	$? \times 4 = 36$	$36 \div 4 = ?$
$? \times 4 = 16$	$16 \div 4 = ?$	$? \times 4 = 32$	$32 \div 4 = ?$
$? \times 4 = 20$	$20 \div 4 = ?$	$? \times 4 = 44$	$44 \div 4 = ?$
$? \times 4 = 12$	$12 \div 4 = ?$	$? \times 4 = 40$	$40 \div 4 = ?$
$? \times 4 = 24$	$24 \div 4 = ?$	$? \times 4 = 48$	$48 \div 4 = ?$

7.  $8 \div 4 = ?$     $\frac{1}{4}$  of  $8 = ?$     $12 \div 4 = ?$     $\frac{1}{4}$  of  $12 = ?$

8.  $\frac{1}{4}$  of  $16 = ?$     $\frac{1}{4}$  of  $20 = ?$     $\frac{1}{4}$  of  $40 = ?$     $\frac{1}{4}$  of  $32 = ?$

## 40. Practice with Uneven Division

Form 7 of your classmates 2-abreast. How many twos are there? How many of the 7 children are left?

$$6 \div 2 = ?$$

$$6 \div 2 = 3$$

$$\begin{array}{r} 3 \\ 2 \overline{)6} \end{array}$$

$$7 \div 2 = ?$$

$$7 \div 2 = 3 \text{ with 1 remainder.}$$

$$\begin{array}{r} 3\frac{1}{2} \\ 2 \overline{)7} \end{array}$$

1. Notice that in dividing 7 by 2 the remainder is written over the 2 in the answer.  $7 \div 2 = 3\frac{1}{2}$ .  $5 \div 2 = ?$

An answer found by dividing one number by another is called a quotient.

Find the quotients and remainders:

[Without pencil.]

- |                      |                      |                      |                       |                       |
|----------------------|----------------------|----------------------|-----------------------|-----------------------|
| 2. $2\overline{)10}$ | 3. $2\overline{)12}$ | 4. $2\overline{)16}$ | 5. $2\overline{)14}$  | 6. $2\overline{)20}$  |
| $2\overline{)11}$    | $2\overline{)13}$    | $2\overline{)17}$    | $2\overline{)15}$     | $2\overline{)21}$     |
| 7. $3\overline{)6}$  | 8. $3\overline{)12}$ | 9. $4\overline{)8}$  | 10. $4\overline{)12}$ | 11. $4\overline{)20}$ |
| $3\overline{)7}$     | $3\overline{)14}$    | $4\overline{)9}$     | $4\overline{)14}$     | $4\overline{)23}$     |

#### 41. Measuring Milk<sup>1</sup>

[Without pencil.]

1. Milk that is to be left at people's houses is usually put into pint and quart bottles at the dairy. Which bottle is the smaller, the pint or the quart?

2. Find by measuring how many pints make a quart.

3. A milkman has 2 quarts of cream to be poured into pint bottles. How many bottles does the milkman need?

4. How many pint bottles are needed to hold 4 quarts of cream? To hold 6 quarts?

5. A pail of milk holding 16 pints is to be poured into quart bottles. How many quart bottles are needed?

<sup>1</sup> For this exercise, pint, quart, and gallon measures (bottles may be used) should be at hand and should be used by the children.



Quart



Pint

6. Make a problem about filling quart bottles with 12 pints of milk.

7. Fill blanks:

1 quart = — pints.

6 pints = — quarts.

3 quarts = — pints.

8 pints = — quarts.

5 quarts = — pints.

10 pints = — quarts.

8 quarts = — pints.

24 pints = — quarts.



Gallon

The milk wagons usually carry gallon cans of milk and cream, besides the filled bottles.

8. Find, by measuring, how many quarts a gallon can holds.

9. How many quarts of milk does a 2-gallon can hold? A 5-gallon can?

10. Fill blanks:

1 gallon = — quarts.

8 quarts = — gallons.

3 gallons = — quarts.

12 quarts = — gallons.

4 gallons = — quarts.

16 quarts = — gallons.

8 gallons = — quarts.

32 quarts = — gallons.

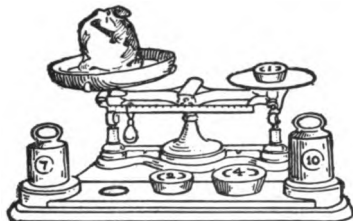
11. Name other things, besides milk, that are measured by pints, quarts, and gallons.

Such things are called liquids.

12. Learn this table of liquid measure:

2 pints (pt.) = 1 quart (qt.).

4 quarts = 1 gallon (gal.).

**42. Weighing Groceries <sup>1</sup>**

**16 ounces (oz.) = 1 pound (lb.).**

[Without pencil.]

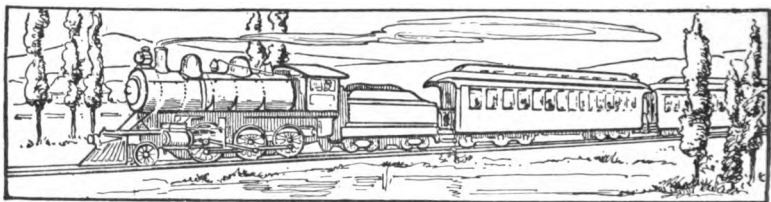
1. Name some of the groceries that are sold by the pound.
2. Lift a pound weight with one hand. Hold objects in the other hand which you think weigh the same.
3. Use other weights in the same way.
4. How many ounces in a pound? In  $\frac{1}{2}$  pound? In  $\frac{1}{4}$  of a pound?
5. What part of a pound is 8 ounces? What part is 4 ounces?
6. Robert bought  $\frac{1}{2}$  pound of tea. How many ounces did he buy?
7. Margaret bought 4 ounces of spice. What part of a pound did she buy?
8. Ruth has two boxes of candy. Each weighs 8 ounces. How many pounds of candy has she?
9. How many ounces in  $1\frac{1}{2}$  pounds? In  $1\frac{1}{4}$  pounds?

<sup>1</sup> Scales and weights should be used in this exercise to give the pupils the necessary sense experience. If they cannot be obtained, bags of sand weighing 1 pound,  $\frac{1}{2}$  pound, and  $\frac{1}{4}$  pound may be substituted.



## CHAPTER III. NUMBERS OF TWO AND THREE FIGURES (continued)

### 43. Railway Travel



An engineer runs his engine 46 miles one hour and 38 miles the next hour. How far does his train travel in the two hours?

To find the distance traveled in two hours, the numbers 46 and 38 are added.

How many units and tens are there in each number?

$$\begin{array}{r} 46 \\ 38 \\ \hline 84 \end{array} \quad \text{Sum}$$

In adding the units, or ones, say: 8, 14.

Since 14 equals 1 ten and 4 units, write the 4 and add the 1 ten to the next column.

In adding the tens, think: 3 tens with the 1 ten make 4 tens. Say: 4, 8.

In giving the answer, say: The sum is 84. The train goes 84 miles in two hours.

[With pencil.]

1. Find the sum of 36 and 27. Of 48 and 28. Of 37 and 57.

2. One engine is pulling 24 freight cars, and another is

pulling 28 freight cars. How many cars are there in the two trains?

3. A passenger train takes 27 minutes going one way on a short run, and 34 minutes returning. How many minutes does it take for the round trip?

4. There are 24 passengers in one car, 54 in another, and 38 in another. How many passengers are there in the three cars?

Find the sums:

$$\begin{array}{r} 5. \ 28 \text{ cars} \\ \underline{38} \end{array} \quad "$$

$$\begin{array}{r} 6. \ 34 \text{ tickets} \\ \underline{24} \end{array} \quad "$$

$$\begin{array}{r} \underline{38} \end{array} \quad "$$

$$\begin{array}{r} 7. \ 104 \text{ passengers} \\ \underline{132} \end{array} \quad "$$

$$\begin{array}{r} \underline{147} \end{array} \quad "$$

#### 44. Practice in Addition

Add:

[With pencil.]

$$\begin{array}{r} 1. \ 22 \\ \underline{28} \end{array}$$

$$\begin{array}{r} 2. \ 43 \\ \underline{38} \end{array}$$

$$\begin{array}{r} 3. \ 54 \\ \underline{36} \end{array}$$

$$\begin{array}{r} 4. \ 85 \\ \underline{16} \end{array}$$

$$\begin{array}{r} 5. \ 27 \\ \underline{27} \end{array}$$

$$\begin{array}{r} 6. \ 138 \\ \underline{44} \end{array}$$

$$\begin{array}{r} 7. \ 23 \\ \underline{33} \\ \underline{26} \end{array}$$

$$\begin{array}{r} 8. \ 13 \\ \underline{25} \\ \underline{25} \end{array}$$

$$\begin{array}{r} 9. \ 12 \\ \underline{13} \\ \underline{25} \end{array}$$

$$\begin{array}{r} 10. \ 122 \\ \underline{133} \\ \underline{106} \end{array}$$

$$\begin{array}{r} 11. \ 234 \\ \underline{142} \\ \underline{16} \end{array}$$

What is the sum of 264 and 382?

$$\begin{array}{r} 264 \\ \underline{382} \\ \hline 646 \end{array} \quad \text{Sum}$$

In adding the units, say: 2, 6.

In adding the tens, say: 8, 14.

14 tens equals 1 hundred and 4 tens. Write the 4 and add the 1 to the hundreds.

In adding the hundreds, think: 3 hundreds with the 1 hundred make 4 hundred. Say: 4, 6.

In giving the answer, say: The sum is 646.

Find the sums:

$$\begin{array}{r} 12. \quad 142 \\ \quad 183 \\ \hline \end{array} \quad \begin{array}{r} 13. \quad 471 \\ \quad 174 \\ \hline \end{array} \quad \begin{array}{r} 14. \quad 263 \\ \quad 264 \\ \hline \end{array} \quad \begin{array}{r} 15. \quad 342 \\ \quad 184 \\ \hline \end{array} \quad \begin{array}{r} 16. \quad 683 \\ \quad 234 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 122 \\ \quad 231 \\ \quad 219 \\ \hline \end{array} \quad \begin{array}{r} 18. \quad 122 \\ \quad 131 \\ \quad 182 \\ \hline \end{array} \quad \begin{array}{r} 19. \quad 133 \\ \quad 214 \\ \quad 115 \\ \hline \end{array} \quad \begin{array}{r} 20. \quad 432 \\ \quad 122 \\ \quad 172 \\ \hline \end{array} \quad \begin{array}{r} 21. \quad 421 \\ \quad 321 \\ \quad 192 \\ \hline \end{array}$$

#### 45. The Steamboat Captain

[With pencil.]

1. In going across the ocean, my ship had on board 320 men, 252 women, and 36 children. How many people were on board?

2. In coming back, my ship carried 462 men, 384 women, and 20 children. How many people were on my ship on the return trip?

3. One day my ship traveled 422 miles; the next day, 409 miles. How far did my ship travel in the two days?

Find the sums:

$$\begin{array}{r} 4. \quad 364 \text{ passengers} \\ \quad 428 \quad \text{"} \\ \hline \end{array} \quad \begin{array}{r} 5. \quad 426 \text{ tickets} \\ \quad 126 \quad \text{"} \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 184 \text{ sailors} \\ \quad 62 \quad \text{"} \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 384 \text{ miles} \\ \quad 172 \quad \text{"} \\ \hline \end{array} \quad \begin{array}{r} 8. \quad 459 \text{ tons of coal} \\ \quad 338 \quad \text{" " "} \\ \hline \end{array} \quad \begin{array}{r} 9. \quad 344 \text{ trunks} \\ \quad 281 \quad \text{"} \\ \hline \end{array}$$

#### 46. Practice in Addition

Add:

[With pencil.]

$$\begin{array}{r} 1. \quad 44 \\ \quad 38 \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 92 \\ \quad 81 \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 37 \\ \quad 47 \\ \hline \end{array} \quad \begin{array}{r} 282 \\ \quad 54 \\ \hline \end{array} \quad \begin{array}{r} 5. \quad 341 \\ \quad 182 \\ \hline \end{array}$$

6. $\begin{array}{r} 73 \\ 82 \\ \hline \end{array}$	7. $\begin{array}{r} 64 \\ 65 \\ \hline \end{array}$	8. $\begin{array}{r} 73 \\ 62 \\ \hline \end{array}$	9. $\begin{array}{r} 324 \\ 128 \\ \hline \end{array}$	10. $\begin{array}{r} 291 \\ 194 \\ \hline \end{array}$
11. $\begin{array}{r} 23 \\ 32 \\ 41 \\ \hline \end{array}$	12. $\begin{array}{r} 42 \\ 36 \\ 16 \\ \hline \end{array}$	13. $\begin{array}{r} 44 \\ 51 \\ 61 \\ \hline \end{array}$	14. $\begin{array}{r} 624 \\ 32 \\ 35 \\ \hline \end{array}$	15. $\begin{array}{r} 321 \\ 242 \\ 352 \\ \hline \end{array}$

# 47. The Number Five in Addition and Subtraction <sup>1</sup>

[Without pencil.]

(1) First give the sums down the columns, then practice giving them across the page.

(2) Subtract the numbers in the same way—first down, then across.

1.			2.			3.		
4. $\begin{array}{r} 5 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 13 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 14 \\ 5 \\ \hline \end{array}$
5. $\begin{array}{r} 15 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 19 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 21 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 23 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 22 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 24 \\ 5 \\ \hline \end{array}$
6. $\begin{array}{r} 25 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 27 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 26 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 29 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 28 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 31 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 33 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 32 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 34 \\ 5 \\ \hline \end{array}$
7. $\begin{array}{r} 35 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 47 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 56 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 39 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 48 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 51 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 43 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 52 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 44 \\ 5 \\ \hline \end{array}$
8. $\begin{array}{r} 65 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 57 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 76 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 49 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 68 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 81 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 73 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 62 \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 74 \\ 5 \\ \hline \end{array}$

<sup>1</sup> See footnote, Part One, page 44.

Add each column from the bottom up; test by adding down:

9.	5	5	5	5	10.	5	5	5	5
	3	2	3	2		3	2	1	2
	2	3	2	3		2	3	4	3
	5	5	5	5		5	5	5	5
	2	2	3	3		4	3	4	5
	2	3	3	4		4	5	5	4
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

Add and test:

[With pencil.]

11.	55	12.	45	13.	35	14.	55	15.	25	16.	55
	43		52		52		23		51		32
	12		33		13		32		54		23
	55		25		45		55		55		55
	12		53		53		34		44		45
	22		43		54		34		35		34
	<u>—</u>		<u>—</u>		<u>—</u>		<u>—</u>		<u>—</u>		<u>—</u>
17.	122	18.	132	19.	215	20.	125	21.	203		
	224		545		235		554		155		
	545		242		344		125		534		
	<u>—</u>		<u>—</u>		<u>—</u>		<u>—</u>		<u>—</u>		

#### 48. The Number Five in Multiplication and Division<sup>1</sup>

[Without pencil.]

1. How many minutes are marked off between XII and I on a clock face? How many between I and II?

2. Count the minutes around the clock face by fives.

<sup>1</sup> To secure rapid and accurate addition, the work must be carefully organized so that the mastery of facts and the process are kept in close relation. An over-emphasis on the mastery of facts to the neglect of column addition leads to a failure on the part of the pupils to transfer facts to process. On the other hand, an over-emphasis on process without drill for the automatic mastery of facts leads many children into such detrimental habits as that of finger counting. To get the best results, the plan of this exercise should be closely followed. See note, page 44 of Part One.

3. Practice giving answers to these tables:

1 five is —.	$1 \times 5 = ?$	$? \times 5 = 10$	$10 \div 5 = ?$
2 fives are —.	$3 \times 5 = ?$	$? \times 5 = 5$	$5 \div 5 = ?$
3 fives are —.	$2 \times 5 = ?$	$? \times 5 = 20$	$20 \div 5 = ?$
4 fives are —.	$4 \times 5 = ?$	$? \times 5 = 30$	$30 \div 5 = ?$
5 fives are —.	$6 \times 5 = ?$	$? \times 5 = 15$	$15 \div 5 = ?$
6 fives are —.	$5 \times 5 = ?$	$? \times 5 = 25$	$25 \div 5 = ?$
7 fives are —.	$7 \times 5 = ?$	$? \times 5 = 35$	$35 \div 5 = ?$
8 fives are —.	$9 \times 5 = ?$	$? \times 5 = 40$	$40 \div 5 = ?$
9 fives are —.	$10 \times 5 = ?$	$? \times 5 = 50$	$50 \div 5 = ?$
10 fives are —.	$11 \times 5 = ?$	$? \times 5 = 45$	$45 \div 5 = ?$
11 fives are —.	$8 \times 5 = ?$	$? \times 5 = 55$	$55 \div 5 = ?$
12 fives are —.	$12 \times 5 = ?$	$? \times 5 = 60$	$60 \div 5 = ?$

4. Play that you are a street-car conductor collecting five-cent fares. How much money should you receive for 5 fares. For 7 fares?

5. At 5 cents a fare, how many people can ride on a street car for 15 cents? For 20 cents? For 40 cents?

6. Four boys, 3 girls, and 2 grown people each pay a five-cent fare. How much does the conductor receive?

7. Make other problems about collecting fares.

8. It takes a street car 20 minutes to go 5 miles. At that rate how many minutes does it take to go 1 mile or  $\frac{1}{5}$  (one-fifth) of the distance?

9. How is  $\frac{1}{2}$  of a number found? How is  $\frac{1}{5}$  of a number found?

10. Find  $\frac{1}{5}$  of 15 minutes.  $\frac{1}{5}$  of 10 hours.  $\frac{1}{5}$  of 25¢.  $\frac{1}{5}$  of 50¢.

### 49. Changing a Number in Subtraction

What is the difference between 32 and 18?<sup>1</sup>

To find the difference between 32 and 18, the number 18 is taken from the number 32.

How many tens and units are there in each number?

Since 8 units cannot be taken from 2 units, the number 32 is changed: 1 ten is taken from the 3 tens and put with the 2 units.

$$\begin{array}{r} 32 \\ 18 \\ \hline \end{array}$$

32 before it is changed equals

3 tens and 2 units



32 after it is changed equals

2 tens and 12 units



	Tens	Units
32 =	2	12
18 =	1	8
14 =	1	4

In subtracting, think of the 2 units as 12 units and the 3 tens as 2 tens.

In taking 8 from 12, say: 4.

In taking 1 from 2, say: 1.

For the answer, say: The difference is 14.

Caution: In taking 18 from 32, say these words only: 4, 1. The difference is 14.

[With pencil.]

1. Subtract 17 from 34, first showing with sticks or marks how to make the change that must be made in 34.

2. Subtract 28 from 42, showing the change in 42.

Find the difference:

3.  $\begin{array}{r} 84 \\ 27 \\ \hline \end{array}$

4.  $\begin{array}{r} 43 \\ 28 \\ \hline \end{array}$

5.  $\begin{array}{r} 82 \\ 54 \\ \hline \end{array}$

6.  $\begin{array}{r} 66 \\ 28 \\ \hline \end{array}$

7.  $\begin{array}{r} 94 \\ 38 \\ \hline \end{array}$

8.  $\begin{array}{r} 92 \\ 24 \\ \hline \end{array}$

<sup>1</sup> In giving the analysis of the process of reduction in subtraction, the explanation should be kept simple, and not forced upon the minds not ready for it. It is the process, not the logic, that is to be mastered.

**ADDITIVE SUBTRACTION.** The economy in performing subtraction by addi-

$$\begin{array}{r} 9. \ 72 \\ \underline{38} \end{array}$$

$$\begin{array}{r} 10. \ 94 \\ \underline{16} \end{array}$$

$$\begin{array}{r} 11. \ 82 \\ \underline{67} \end{array}$$

$$\begin{array}{r} 12. \ 83 \\ \underline{36} \end{array}$$

$$\begin{array}{r} 13. \ 95 \\ \underline{27} \end{array}$$

$$\begin{array}{r} 14. \ 84 \\ \underline{16} \end{array}$$

$$\begin{array}{r} 15. \ 81 \\ \underline{48} \end{array}$$

$$\begin{array}{r} 16. \ 96 \\ \underline{68} \end{array}$$

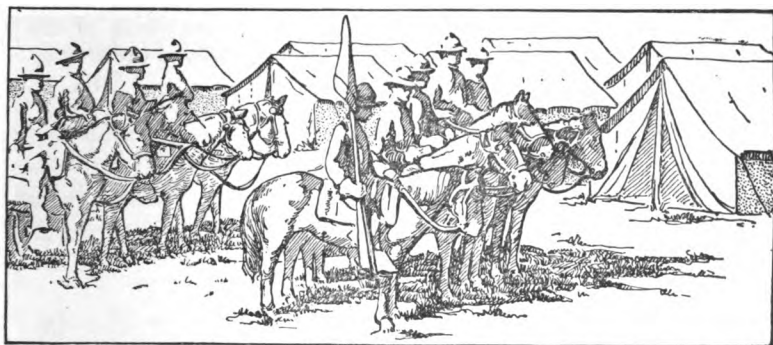
$$\begin{array}{r} 17. \ 52 \\ \underline{35} \end{array}$$

$$\begin{array}{r} 18. \ 74 \\ \underline{49} \end{array}$$

$$\begin{array}{r} 19. \ 62 \\ \underline{27} \end{array}$$

$$\begin{array}{r} 20. \ 73 \\ \underline{57} \end{array}$$

## 50. Soldiers in Camp



## I

[With pencil.]

1. There are 32 soldiers on horseback; 15 dismount. How many are still on their horses?
2. Take 28 guns from 44 guns. How many are left?
3. There were 42 tents in a camp; 27 were taken down. How many were left standing?
4. Out of 32 cannon 14 were taken away. How many were left?

tion comes in learning the fundamental facts, not in the work with the process. The habit of thinking from one number to another once established, the briefer terminology of subtraction may be used and the process performed as above.



## II

How many soldiers are left in camp, if, out of 425 soldiers, 183 are sent off on a march?

To find how many soldiers are left in camp, the difference between 425 and 183 is found.

How many units, tens, and hundreds are there in each number?

(1)  $425 - 183 = ?$

$$\begin{array}{r} 425 \\ 183 \\ \hline 242 \end{array}$$

In taking 3 from 5, say: 2.

Before subtracting the tens, think of the 2 in the number 425 as 12 and the 4 as 3.

In taking 8 from 12, say: 4.

In taking 1 from 3, say: 2.

In giving the answer, say: The difference is 242. There are 242 soldiers left in camp.

[Without pencil.]

1. How many horses are left in the camp, if, from 226 horses there, 174 are taken away?

Find the difference:

2.  $824$  guns  
 $\underline{142}$  "

3.  $645$  swords  
 $\underline{172}$  "

4.  $514$  cartridge belts  
 $\underline{232}$  " "

(2)  $80 - 24 = ?$

(3)  $407 - 132 = ?$

	Tens	Units
80	7	10
24	2	4
56	5	6

	Hundreds	Tens	Units
407	3	10	7
132	1	3	2
275	2	7	5

Notice in problem (2) above that the 80 is changed to 7 tens and 10 units, and in problem (3) the 407 is changed to 3 hundreds, 10 tens and 7 units.

First think the changes needed, then subtract:

5.  $\underline{60}$   
 $\underline{23}$

6.  $\underline{90}$   
 $\underline{44}$

7.  $\underline{503}$   
 $\underline{121}$

8.  $\underline{408}$   
 $\underline{234}$

9.  $\underline{907}$   
 $\underline{242}$

10.  $\underline{809}$   
 $\underline{325}$

## 51. Practice in Subtraction

(1) Tell which numbers need to be changed when subtracting.

(2) Subtract, thinking the changes needed.

[With pencil.]

1. $\begin{array}{r} 96 \\ 33 \\ \hline \end{array}$	2. $\begin{array}{r} 42 \\ 16 \\ \hline \end{array}$	3. $\begin{array}{r} 51 \\ 15 \\ \hline \end{array}$	4. $\begin{array}{r} 87 \\ 34 \\ \hline \end{array}$	5. $\begin{array}{r} 64 \\ 27 \\ \hline \end{array}$	6. $\begin{array}{r} 92 \\ 43 \\ \hline \end{array}$
------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------

7. $\begin{array}{r} 864 \\ 242 \\ \hline \end{array}$	8. $\begin{array}{r} 562 \\ 143 \\ \hline \end{array}$	9. $\begin{array}{r} 281 \\ 145 \\ \hline \end{array}$	10. $\begin{array}{r} 524 \\ 131 \\ \hline \end{array}$	11. $\begin{array}{r} 482 \\ 324 \\ \hline \end{array}$
--------------------------------------------------------	--------------------------------------------------------	--------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

12. $\begin{array}{r} 475 \\ 143 \\ \hline \end{array}$	13. $\begin{array}{r} 519 \\ 128 \\ \hline \end{array}$	14. $\begin{array}{r} 642 \\ 161 \\ \hline \end{array}$	15. $\begin{array}{r} 309 \\ 143 \\ \hline \end{array}$	16. $\begin{array}{r} 807 \\ 621 \\ \hline \end{array}$
---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

52. Additive Subtraction<sup>1</sup>

$$92 - 38 = ?$$

$$\begin{array}{r} 92 \\ 38 \\ \hline 54 \end{array}$$

In solving this problem by addition, first add 10 to the 2 units in 92, calling the 2, 12. Then say: 8 and 4 are 12. Write the 4.

Since ten has been added to the number 92, it must be added to the number 38. 1 ten added to the 3 tens makes 4 tens. Say: 4 and 5 are 9. Write the 5. Say: The difference is 54.

$$748 - 563 = ?$$

$$\begin{array}{r} 748 \\ 563 \\ \hline 185 \end{array}$$

In solving this problem, say: 3 and 5 are 8. Write the 5. Add 10 tens to the 4 tens, calling the 4 tens, 14 tens. Say: 6 and 8 are 14. Write the 8.

Since 10 tens, or 1 hundred, has been added to 748, it must be added to 563. 1 hundred added to 5 hundred makes 6 hundred. Say: 6 and 1 are 7. Write the 1. Say: The difference is 185.

<sup>1</sup> Only one method of subtraction should be used. In schools where subtraction is taught as a form of addition, the above problems and their solutions may be substituted for those on pages 56 and 58.

## 53. Practice in Addition and Subtraction

Add:

[With pencil.]

1. $\begin{array}{r} 44 \\ 37 \\ \hline \end{array}$	2. $\begin{array}{r} 63 \\ 28 \\ \hline \end{array}$	3. $\begin{array}{r} 42 \\ 19 \\ \hline \end{array}$	4. $\begin{array}{r} 153 \\ 27 \\ \hline \end{array}$	5. $\begin{array}{r} 245 \\ 135 \\ \hline \end{array}$	6. $\begin{array}{r} 144 \\ 128 \\ \hline \end{array}$
------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	-------------------------------------------------------	--------------------------------------------------------	--------------------------------------------------------

7. $\begin{array}{r} 22 \\ 34 \\ 35 \\ \hline \end{array}$	8. $\begin{array}{r} 14 \\ 13 \\ 24 \\ \hline \end{array}$	9. $\begin{array}{r} 32 \\ 14 \\ 14 \\ \hline \end{array}$	10. $\begin{array}{r} 123 \\ 134 \\ 13 \\ \hline \end{array}$	11. $\begin{array}{r} 212 \\ 34 \\ 125 \\ \hline \end{array}$	12. $\begin{array}{r} 324 \\ 424 \\ 103 \\ \hline \end{array}$
------------------------------------------------------------	------------------------------------------------------------	------------------------------------------------------------	---------------------------------------------------------------	---------------------------------------------------------------	----------------------------------------------------------------

13. $\begin{array}{r} 134 \\ 244 \\ 104 \\ \hline \end{array}$	14. $\begin{array}{r} 133 \\ 234 \\ 414 \\ \hline \end{array}$	15. $\begin{array}{r} 233 \\ 104 \\ 105 \\ \hline \end{array}$	16. $\begin{array}{r} 444 \\ 113 \\ 125 \\ \hline \end{array}$	17. $\begin{array}{r} 232 \\ 142 \\ 152 \\ \hline \end{array}$	18. $\begin{array}{r} 131 \\ 241 \\ 143 \\ \hline \end{array}$
----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------

Subtract:

19. $\begin{array}{r} 48 \\ 23 \\ \hline \end{array}$	20. $\begin{array}{r} 74 \\ 32 \\ \hline \end{array}$	21. $\begin{array}{r} 89 \\ 45 \\ \hline \end{array}$	22. $\begin{array}{r} 176 \\ 123 \\ \hline \end{array}$	23. $\begin{array}{r} 290 \\ 40 \\ \hline \end{array}$	24. $\begin{array}{r} 377 \\ 143 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	--------------------------------------------------------	---------------------------------------------------------

25. $\begin{array}{r} 92 \\ 28 \\ \hline \end{array}$	26. $\begin{array}{r} 84 \\ 17 \\ \hline \end{array}$	27. $\begin{array}{r} 76 \\ 38 \\ \hline \end{array}$	28. $\begin{array}{r} 181 \\ 135 \\ \hline \end{array}$	29. $\begin{array}{r} 292 \\ 146 \\ \hline \end{array}$	30. $\begin{array}{r} 394 \\ 167 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

31. $\begin{array}{r} 82 \\ 27 \\ \hline \end{array}$	32. $\begin{array}{r} 94 \\ 39 \\ \hline \end{array}$	33. $\begin{array}{r} 82 \\ 37 \\ \hline \end{array}$	34. $\begin{array}{r} 328 \\ 142 \\ \hline \end{array}$	35. $\begin{array}{r} 864 \\ 182 \\ \hline \end{array}$	36. $\begin{array}{r} 925 \\ 463 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

Find answers:

37.  $24 + 35 + 22 = ?$

42.  $302 + 45 + 34 = ?$

38.  $213 + 101 + 325 = ?$

43.  $88 - 35 = ?$

39.  $132 + 442 + 153 = ?$

44.  $467 - 234 = ?$

40.  $424 + 538 = ?$

45.  $92 - 57 = ?$

41.  $\begin{array}{r} 142 \\ \hline \end{array} + 325 + 45 = ?$

46.  $382 - 126 = ?$

## 54. Doing Errands

John's mother sent him to the grocer's to buy 2 packages of cereal at 24¢ a package. How much money did he need?

To find how much money John needed, 24¢ is multiplied by 2.

$$24 \times 2 = ?$$

$$\begin{array}{r} 24 \\ 2 \\ \hline \end{array}$$

Since 2 times 4 is 8, in finding the answer first say and write 8.

Then since 2 times 2 is 4, say and write 4.

In giving the answer say: John needed 48¢.

Notice that in the problem  $24 \times 2 = ?$  the  $\times$  is read **multiplied by**.

[With pencil.]

1. 42 multiplied by 2 equals how much?
2. 51 multiplied by 3 equals how much?
3. 41 multiplied by 5 equals how much?
4. Suppose your mother sent you to buy 3 dozen bananas at 32¢ a dozen. How much money would you need?

Find how much money is needed:

5. To pay for 3 boxes of raisins at 22¢ a box.
6. To pay for 2 cans of corn at 23¢ a can.
7. To pay for 3 boxes of starch at 20¢ a box.
8. To pay for 2 boxes of cookies at 30¢ a box.
9. To pay for 2 quarts of molasses at 22¢ a quart.

Multiply:

$$\begin{array}{r} 10. \ 21 \\ \ 2 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \ 23 \\ \ 3 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \ 14 \\ \ 2 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \ 32 \\ \ 3 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \ 41 \\ \ 4 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \ 40 \\ \ 2 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \ 30 \\ \ 3 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \ 20 \\ \ 4 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \ 21 \\ \ 4 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \ 43 \\ \ 3 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \ 51 \\ \ 6 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \ 52 \\ \ 4 \\ \hline \end{array}$$

55. The Number Six in Addition and Subtraction<sup>1</sup>

[Without pencil.]

- (1) First give sums down the columns, then practice giving them across the page.
- (2) Subtract the numbers in the same way — first down, then across.

	1.			2.			3.		
4.	6	8	7	9	11	12	14	13	15
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
5.	16	18	17	19	21	22	24	23	25
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
6.	36	48	67	59	81	72	64	83	95
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
7.	56	78	37	49	61	82	94	73	85
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>

<sup>1</sup> FLASH CARDS. For quick work with tables, flash cards are convenient. These cards are made about 4 inches square, and two digits are written on each side of a card, in different positions, one the reverse of the other. The teacher holds up a pack of such cards and exposes one card at a time in rapid succession. The children answer in turn, adding or multiplying the numbers as determined by the teacher at the beginning of the exercise. The numbers on the reverse side enable the teacher to tell what combination is called for, and so to know whether or not a child fails to give a correct answer. When a wrong answer is given, the child takes his card to study and report upon later.

A game, similar to the one described on page 30 of Part One, may also be played with these cards.



Add each column from the bottom up; test by adding down:

8.	4	5	3	4	9.	4	5	2	3
	6	5	6	6		6	6	2	3
	2	6	4	4		4	4	6	6
	2	4	6	6		6	6	4	4
	6	6	4	4		3	4	6	6
	4	5	3	4		4	5	2	3
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

Add and test:

[With pencil.]

10.	43	11.	46	12.	55	13.	56	14.	66	15.	56
	66		62		66		64		44		64
	44		42		44		46		66		46
	36		46		56		64		45		64
	<u>43</u>		<u>44</u>		<u>45</u>		<u>64</u>		<u>34</u>		<u>53</u>

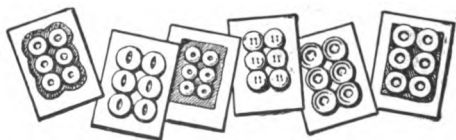
## 56. The Number Six in Multiplication and Division

### I

[Without pencil.]

1. How many buttons are there on each of these cards?  
How many altogether?

2. Practice counting the buttons by sixes, then give the answers to these tables:



1 six is —.	$2 \times 6 = ?$	$? \times 6 = 18$	$18 \div 6 = ?$
2 sixes are —.	$1 \times 6 = ?$	$? \times 6 = 12$	$12 \div 6 = ?$
3 sixes are —.	$3 \times 6 = ?$	$? \times 6 = 6$	$6 \div 6 = ?$
4 sixes are —.	$5 \times 6 = ?$	$? \times 6 = 30$	$30 \div 6 = ?$
5 sixes are —.	$4 \times 6 = ?$	$? \times 6 = 24$	$24 \div 6 = ?$
6 sixes are —.	$6 \times 6 = ?$	$? \times 6 = 36$	$36 \div 6 = ?$

3. Tennis balls are to be packed 6 in a box. How many balls can be packed in 3 boxes? In 4 boxes? In 6 boxes?

4. Picture postal cards are to be put into envelopes. Each envelope is to hold 6 postal cards. How many envelopes are needed for 12 postal cards? For 24 postal cards? For 30?

5. Ribbon badges are to be made 6 inches long. How many can be cut from 18 inches of ribbon? From 36 inches?

6. There are 6 working days in a week. Make a problem about a man working 3 weeks. Make a problem about a man working 5 weeks.

## II

[Use pencil only when needed.]

1. What is the sum of 7 sixes?

2.  $42 + 6 = ?$   $48 + 6 = ?$   $54 + 6 = ?$   $60 + 6 = ?$   $66 + 6 = ?$

3. What is the sum of 8 sixes? Of 9 sixes? Of 10 sixes? Of 11 sixes? Of 12 sixes?

4. Count by sixes from 6 to 72.

5. Practice giving the answers to these tables: <sup>1</sup>.

7 sixes are —.	$10 \times 6 = ?$	$? \times 6 = 48$	$48 \div 6 = ?$
8 sixes are —.	$11 \times 6 = ?$	$? \times 6 = 42$	$42 \div 6 = ?$
9 sixes are —.	$7 \times 6 = ?$	$? \times 6 = 60$	$60 \div 6 = ?$
10 sixes are —.	$9 \times 6 = ?$	$? \times 6 = 54$	$54 \div 6 = ?$
11 sixes are —.	$8 \times 6 = ?$	$? \times 6 = 72$	$72 \div 6 = ?$
12 sixes are —.	$12 \times 6 = ?$	$? \times 6 = 66$	$66 \div 6 = ?$

6. Play you are at a grocery. At 6 cents a cake, how much must you pay for 8 cakes of soap? For 12 cakes?

<sup>1</sup> For complete table, see page 276.

7. Make statements about buying bars of peanut candy at 6¢ a bar. About buying little cakes at 6¢ apiece.

8. If you place 12 coins in 6 equal piles, how many will there be in each pile, or in  $\frac{1}{6}$  (one sixth) of the number?

9. How is  $\frac{1}{6}$  of a number found?

10. Find  $\frac{1}{6}$  of 60¢.  $\frac{1}{6}$  of \$18.  $\frac{1}{6}$  of 30 barrels.  $\frac{1}{6}$  of 48 boxes.

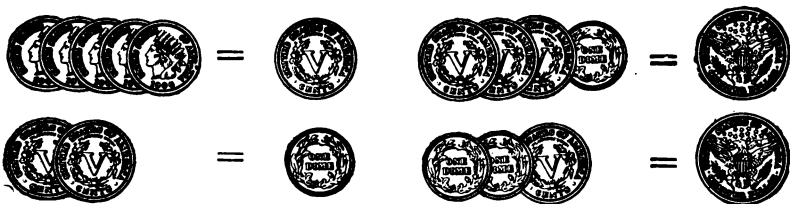
11. What is the answer when 60 is multiplied by 2, or taken 2 times?

12. Multiply:

[With pencil.]

64	61	60	63	62	61	60	61
<u>2</u>	<u>5</u>	<u>7</u>	<u>3</u>	<u>4</u>	<u>8</u>	<u>6</u>	<u>9</u>

### 57. Toy Banks



[Without pencil.]

1. What smaller coins are equal to a five-cent piece or nickel? To a dime? To a quarter?

2. Fill blanks:

1 nickel = — cents.

1 quarter = 1 dime and — nickels.

1 dime = — nickels.

1 quarter = 1 nickel and — dimes.

1 dime = — cents.

1 quarter = — cents.



3. Would you rather have 3 nickels or 10 cents? 2 dimes or 3 nickels? 1 quarter or 5 nickels?



4. Robert has 1 dime, 1 nickel, and 4 cents in his bank. How much money has he in his bank?

5. How much money would there be in Robert's bank if he should put in another dime?

Find how much money is in the toy bank of each of the following children:

6. Tom has 2 dimes, 1 nickel, and 2 cents.
7. Denison has 14 cents, 1 dime, and 2 nickels.
8. Frank has 3 dimes, 3 nickels, and 3 cents.
9. John has 1 quarter, 1 nickel, and 4 cents.
10. Grace has 5 nickels and 1 dime.
11. Marion has 5 dimes and 2 nickels.
12. Fred has 1 quarter and 2 dimes.

The sign ¢ is read **cent** or **cents**.

Find how much money each of these children had left:

13. Mary had 25¢ in coins in her bank. She took out 15¢ to buy some flowers.
14. Richard had 50¢ in his bank. He took out a dime to buy a notebook.
15. Ellen had 40¢ in her bank. She took out 10¢ for ice-cream and 5¢ for candy.

Fill blanks:

16. 6 nickels = — cents.

8 nickels = — cents.

7 nickels = — cents.

10 nickels = — cents.

9 nickels = — cents.

18. 1 dime = — cents.

3 dimes = — cents.

5 dimes = — cents.

4 dimes = — cents.

2 dimes = — cents.

17. 20 cents = — nickels.

40 cents = — nickels.

30 cents = — nickels.

45 cents = — nickels.

50 cents = — nickels.

19. 20 cents = — dimes.

40 cents = — dimes.

30 cents = — dimes.

10 cents = — dimes.

50 cents = — dimes.

How much money have I if I have:

20. 3 dimes and 1 nickel?

21. 2 dimes and 3 nickels?

22. 4 dimes and 2 nickels?

23. 3 dimes and 3 nickels?

24. 1 quarter and 1 dime?

25. 1 quarter and 1 nickel?

26. 1 quarter and 3 nickels?

27. 1 nickel and 1 dime?

28. 1 nickel and 2 dimes?

29. 3 nickels and 2 dimes?

30. 5 nickels and 2 dimes?

31. 2 dimes and 1 quarter?

32. 2 nickels and 1 quarter?

33. 4 nickels and 1 quarter?

Find how much is left when:

34. Out of 20 cents, 10 cents is spent.

35. Out of 15 cents, 8 cents is spent.

36. Out of 25 cents, 10 cents is spent.

37. Out of 30 cents, 5 cents is spent.

38. Out of 40 cents, 20 cents is spent.

## 58. At the Candy Counter

[Without pencil.]

Mary bought 5 cents' worth of candy and gave the clerk a quarter. The clerk gave Mary 2 dimes in change, counting it out in this way: "5, 15, 25."



1. Pretend that each of the children in these conversations gives the clerk a quarter. Fill blanks:

ROBERT: I will take 15 cents' worth of chocolates, if you please.

CLERK: (giving Robert 2 nickels): 15, —, —.

HELEN: Give me 10 cents' worth of lemon drops, please.

CLERK: (giving Helen a dime and a nickel): 10, —, —. Thank you.

FRANK: I should like 5 cents' worth of peanut candy, if you please.

CLERK (giving Frank 4 nickels): 5, —, —, —, —. Thank you.

2. Use toy money and count out the change from a quarter for 15 cents' worth of candy.

3. Count out the change from a quarter for an ice-cream soda costing 10 cents.

4. Count out the change from a quarter for other amounts.

## 59. A Third-Grade Toy Shop



## I

This is a picture of a schoolroom toy shop. The children in the room first cut out pictures of toys and pasted them on cardboard. Next they wrote prices on the cards and placed the cards in sight of all the other children. When every one was ready to play, one child was chosen shopkeeper and allowed to keep his place until he made a mistake. The other children took turns buying toys. This is the way they talked when making a purchase:

FRED: Good morning.

SHOPKEEPER: Good morning.

FRED: What is the price of the balls?

SHOPKEEPER: The small ones are 5¢, and the larger ones 10¢.

FRED: I'll take one of the ten-cent size, if you please. Here is a quarter.

SHOPKEEPER: Here is your change: 10, 20, 25. Thank you.

To have a schoolroom toy shop of your own, first get pictures of toys ready to use; then, with the help of either real or toy money, play at buying and selling.<sup>1</sup>

## II

[Without pencil.]

1. Choose 2 toys from the pictures on page 69 and find the cost of the two together.

Find the cost:

2. Of a kite for 14¢ and a ball for 8¢.
3. Of an airship for 25¢ and a sailboat for 10¢.
4. Of a doll's carriage for 50¢ and a doll for 20¢.
5. Of a drum for 40¢ and a cannon for 15¢.
6. Of a doll's bed for 30¢ and a set of dishes for 18¢.

Find the change:

7. From 25¢ in buying a set of soldiers for 16¢.
8. From 20¢ in buying a cannon for 15¢.
9. From 25¢ in buying 3 chairs at 4¢ each.
10. From 25¢ in buying 2 tops at 5¢ each.
11. From 25¢ in buying a doll at 20¢.
12. From 30¢ in buying an airship for 25¢.

<sup>1</sup> To make playing store successful with a large class of children: (1) Have two boxes of money, — one for the customers to use, the other for the clerk; (2) See that a price list is written on the board and that every child has his purchases chosen and amount of cost computed before leaving his seat; (3) To keep the play moving rapidly, see that there is always at least one child waiting his turn to be served; (4) Train the children to speak so that their classmates can hear all the prices and can make the computation for the purchases of each customer; (5) Have children watch so as to correct mistakes. A clerk should lose his place whenever he makes a mistake, and the first child to notice the mistake should take his place.

13. From 2 dimes in buying a toy for 15¢.
14. From 3 dimes in buying a toy for 25¢.
15. Mary bought a doll for 15¢, a doll's cradle for 6¢, and a ball for 8¢. How much did the three cost together?
16. Tom had 40¢. He spent 35¢ for a garden rake. How much did he have left?
17. Robert had 35¢. He spent 25¢ for a toy airship. He had left — cents.
18. Play that you have 50¢ to spend for toys. Tell how you would spend it.
19. Make a problem about buying a toy for 75¢ and giving the clerk 8 dimes.

### 60. Making Price Lists

#### 1. Read:

2 dollars	5 cents	\$1.25
\$2	5¢	\$4.05
\$2.00	\$.05	\$5.50

2. Write five dollars in three different ways.
3. Write eight cents in three different ways.
4. Write one dollar and thirty cents. Two dollars and three cents. Six dollars and fifty cents.

The point that separates dollars and cents is called a **decimal point**.

5. Find the decimal points in the numbers above.

6. Read this price list:

Balls, 10¢.	Sleds, \$2.00.	Toy tables, \$1.35.
Tops, \$.03.	Doll carriages, \$3.	Tea sets, \$.98.
Knives, \$.30.	Dolls, 69¢.	Toy beds, \$1.50.
Watches, \$.75.	Doll chairs, \$.18.	Toy pianos, \$1.45.

7. Write each price in this list, using a decimal point and a dollar sign:

Airships, 49¢.	Magic lanterns, 3 dollars.
Engines, 12 cents.	Sets of soldiers, 2 dollars.
Cars, 5 cents.	Toy cannon, 98 cents.
Dolls, 29¢.	Steamboats, 1 dollar and 25 cents.

8. Read:

65¢	\$.40	\$.10	\$4.00	\$10.00	\$24.00
95¢	\$1.95	\$.42	\$4.42	\$.65	\$7.65
\$5.25	\$6.10	\$9.08	\$25.25	\$20.00	\$50.75.

9. Make a price list of the toys in the picture on page 69. Use dollar signs.

10. Practice making price lists of your own.

## 61. Writing Money in Addition and Subtraction

### I

What is the cost of a sled at \$2.00, a pair of skates at \$1.25, and a toy horn at 25¢?

$$\$2.00 + \$1.25 + .25 = ?$$

$$\begin{array}{r} \$2.00 \\ 1.25 \\ .25 \\ \hline \$3.50 \end{array}$$

Tom had \$3.75 and spent \$2.50. How much did he have left?

$$\$3.75 - \$2.50 = ?$$

$$\begin{array}{r} \$3.75 \\ 2.50 \\ \hline \$1.25 \end{array}$$

In writing sums of money in a column for addition or subtraction, place the decimal points under one another.

Before what two numbers in each of these problems is the dollar sign written?

[Use pencil only when needed.]

Read and then add:

1. \$4.00	2. \$3.25	3. \$6.46	4. \$4.00	5. \$1.06
2.25	5.04	3.02	.45	.36
.64	1.12	.22	3.26	.21
<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>
\$	\$	\$	\$	\$

Read and then subtract:

6. \$6.80	7. \$7.85	8. \$5.98	9. \$4.82	10. \$9.75
2.40	1.42	2.45	.74	.39
<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>
\$	\$	\$	\$	\$

11. How much must be paid for a doll at \$.40 and a doll's carriage at \$1.35?

12. A magic lantern is bought for \$1.10, a set of soldiers for 60¢, and a toy airship for 40¢. Find the cost.

13. Tom buys a story book for \$1.20, a sled for \$1.25, and a pair of skating shoes for \$2.20. How much money does he spend?

14. Fred had \$4.70 in his bank. Out of this money he bought a football for \$2.30. Find how much he had left.



15. How much will Helen have left if she takes \$1.25 from \$5.75 and buys a set of dishes?

16. Ruth bought her father a book for \$1.25 and her mother a plant for \$.50. How much money did she spend?

17. From \$2.75 John spent \$1.40 for a set of garden tools. How much money did he have left?

18. How much money will Frank have left if, out of \$6.80, he spends \$4.75?

## II

[With pencil.]

Write in columns and add:

1. \$.24, \$.06, \$.64.

6. \$2.25, \$.25.

2. \$.08, \$.32, \$.43.

7. \$3.50, \$.20.

3. \$4.00, \$6.00, \$5.00.

8. \$1.50, \$.25, \$.32.

4. \$10.00, \$22.00, \$5.00.

9. \$6.00, \$.45, \$2.25.

5. \$2.04, \$3.50, \$1.45.

10. \$5.25, \$10.00, \$.35.

Write in columns and subtract:

11. \$3.98, \$.64.

16. \$4.75, \$1.66.

12. \$7.45, \$3.25.

17. \$9.82, \$3.26.

13. \$4.82, \$1.44.

18. \$5.42, \$3.28.

14. \$6.69, \$3.30.

19. \$7.44, \$.37.

15. \$5.95, \$3.92.

20. \$9.67, \$3.85.

21. Use this price list for problems like those on page 73:

Footballs, \$2.25 each.

Dolls, \$.72 each.

Baseballs, \$.80 each.

Toy pianos, \$1.25 each.

Roller skates, \$1.30 a pair.

Toy cradles, \$.35 each.

Jackknives, \$.20 each.

Dolls' high chairs, 20¢ each.

## 62. Trimming a Christmas Tree

[Without pencil.]

This is a picture of a school Christmas tree.

1. Helen and Ruth made the candy bags. They bought 3 yards of muslin at 10 cents a yard and some red yarn for 5 cents. Find the cost.

2. John and Frank and some of the girls made chains. The popcorn chain was 30 feet long, and the cranberry chain 24 feet long. How many yards long was each?

3. Fred brought a dozen red candles and  $\frac{1}{2}$  dozen white ones. How many candles did he bring?

4. For other ornaments, the children bought a picture of Santa Claus for 10 cents, a toy reindeer for 12 cents, a Christmas star for 5 cents, and some gilt balls costing 10 cents. Find the cost of these ornaments.

5. Play that you have 25¢ to spend for Christmas tree ornaments. With the help of the price list below, tell how you would spend it.

Christmas stars, 3¢.

Glass balls, 5¢.

Candles, 10¢ a dozen.

Candle holders, 1¢ each.



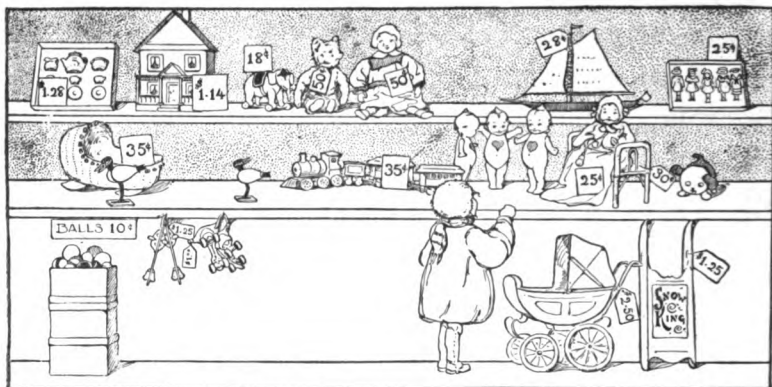
Pictures of Santa Claus, 10¢.

Tinsel, 2¢ a yard.

Toy animals, 6¢.

Candy boxes, 4¢.

## 63. Buying Christmas Presents



[With pencil.]

1. Play that you are buying Christmas presents. Choose two presents from the picture, and find their cost.

Find how much each of these children spent:

2. Mary bought for her little sister a baby doll for 25¢ and a doll's cradle for 35¢.

3. Frank bought for his little brother a toy ship for 28 cents, a knife for 25 cents, a ball for 10 cents, and a singing top for 15 cents.

4. Helen bought for her brother a railway train at 35¢; for her sister, a set of dishes at \$1.28; and for her cousin, a set of paper dolls at 25¢.

5. Robert bought for his sister a playhouse at \$1.14; for his baby brother a toy elephant at 18¢; and for his elder brother a pair of skates at \$1.25.

Find how much money each of these children had left:

6. Margaret had \$1.75 and spent \$1.25 for a sled for her brother.

7. Fred had \$2.25 and spent \$1.18 for a workbasket for his mother.

8. Grace had \$1.45 and spent 75¢ for a knife for her brother.

9. William had \$2.40 and spent \$1.35 for a doll carriage for his sister.

10. The price of a toy village is \$1.50; the price of a toy circus, \$1.28. How much more must be paid for the village than for the circus?

11. Make a problem about buying a story book for \$1.25, a paint box for \$.35, and a game for \$.25.

12. Make a problem about having \$3.50 and spending \$1.25 for a sled.

13. Use this price list and make and solve other problems about buying Christmas presents.

Puzzles, 10¢, 15¢.

Small dolls, 15¢, 25¢, 50¢.

Games, 15¢, 25¢.

Large dolls, \$.75, \$1.25, \$2.75.

Story books, 50¢, 75¢.

Express wagons, \$2.18, \$3.50.

Building blocks, 45¢, 80¢.

Sets of tools, \$2.25, \$4.50.

#### 64. Review and Practice

[With pencil.]

Add:

$$\begin{array}{r} 1. \quad 425 \\ \quad 376 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 564 \\ \quad 237 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 306 \\ \quad 219 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 254 \\ \quad 378 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 516 \\ \quad 248 \\ \hline \end{array}$$

Add:

$$\begin{array}{r} 6. \ 344 \\ 245 \\ \hline 132 \end{array}$$

$$\begin{array}{r} 7. \ 520 \\ 346 \\ \hline 125 \end{array}$$

$$\begin{array}{r} 8. \ 425 \\ 324 \\ \hline 463 \end{array}$$

$$\begin{array}{r} 9. \ \$2.34 \\ 1.55 \\ \hline 4.06 \end{array}$$

$$\begin{array}{r} 10. \ \$5.60 \\ 3.42 \\ \hline 1.45 \end{array}$$

$$\begin{array}{r} 11. \ 143 \\ 350 \\ 254 \\ \hline 135 \end{array}$$

$$\begin{array}{r} 12. \ 214 \\ 325 \\ 146 \\ \hline 123 \end{array}$$

$$\begin{array}{r} 13. \ 122 \\ 340 \\ 255 \\ \hline 344 \end{array}$$

$$\begin{array}{r} 14. \ \$1.42 \\ 3.50 \\ 1.44 \\ \hline 2.13 \end{array}$$

$$\begin{array}{r} 15. \ \$3.40 \\ 3.45 \\ .54 \\ \hline 1.32 \end{array}$$

Subtract:

$$\begin{array}{r} 16. \ 483 \\ 251 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \ 342 \\ 134 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \ 624 \\ 350 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \ \$5.84 \\ 2.13 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \ \$7.92 \\ 3.46 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \ 789 \\ 245 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \ 647 \\ 360 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \ \$740 \\ 124 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \ \$6.70 \\ 1.32 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \ \$8.43 \\ 1.56 \\ \hline \end{array}$$

**65. Progress Score**

These are tests or “examinations” to help you in finding out what you can do with numbers. Try to make 100 points on each test.<sup>1</sup>

[With pencil.]

I. Add. Count 10 for each correct answer.

$$\begin{array}{r} 1. \ 23 \\ 46 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \ 50 \\ 23 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \ 24 \\ 48 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \ 5 \\ 4 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 5. \ 24 \\ 54 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 6. \ 432 \\ 395 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \ 144 \\ 325 \\ \hline 434 \end{array}$$

$$\begin{array}{r} 8. \ \$2.45 \\ 3.24 \\ \hline 2.13 \end{array}$$

$$\begin{array}{r} 5 \\ 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 46 \\ 55 \\ \hline \end{array}$$

<sup>1</sup> All problems may be copied before a test is given or answers, where possible, may be written on the folds of a sheet of paper placed below problems.

Write in columns and find answers:

9.  $440 + 324 + 455 + 343 + 241 = ?$

10.  $\$2.23 + \$4.15 + \$1.34 = ?$

II. Subtract. Count 10 for each correct answer.

1.  $\begin{array}{r} 46 \\ 24 \\ \hline \end{array}$

2.  $\begin{array}{r} 53 \\ 40 \\ \hline \end{array}$

3.  $\begin{array}{r} 32 \\ 5 \\ \hline \end{array}$

4.  $\begin{array}{r} 54 \\ 26 \\ \hline \end{array}$

5.  $\begin{array}{r} 729 \\ 162 \\ \hline \end{array}$

6.  $\begin{array}{r} 70 \\ 32 \\ \hline \end{array}$

7.  $\begin{array}{r} 632 \\ 354 \\ \hline \end{array}$

8.  $\begin{array}{r} 548 \\ 260 \\ \hline \end{array}$

9.  $\begin{array}{r} \$6.72 \\ 2.43 \\ \hline \end{array}$

10.  $\begin{array}{r} \$5.60 \\ 2.24 \\ \hline \end{array}$

III. Multiply. Count 5 for each correct answer.

1.  $7 \times 5 = ?$

8.  $7 \times 6 = ?$

15.  $30 \times 8 = ?$

2.  $6 \times 4 = ?$

9.  $12 \times 4 = ?$

16.  $41 \times 9 = ?$

3.  $9 \times 0 = ?$

10.  $12 \times 6 = ?$

17.  $60 \times 7 = ?$

4.  $8 \times 6 = ?$

11.  $31 \times 5 = ?$

18.  $42 \times 4 = ?$

5.  $7 \times 4 = ?$

12.  $62 \times 3 = ?$

19.  $51 \times 6 = ?$

6.  $9 \times 5 = ?$

13.  $53 \times 3 = ?$

20.  $61 \times 9 = ?$

7.  $8 \times 4 = ?$

14.  $61 \times 5 = ?$

IV. Divide. Count 5 for each correct answer.

1.  $18 \div 2 = ?$

8.  $28 \div 4 = ?$

15.  $\frac{1}{5}$  of 50 = ?

2.  $16 \div 2 = ?$

9.  $36 \div 4 = ?$

16.  $42 \div 6 = ?$

3.  $24 \div 3 = ?$

10.  $\frac{1}{4}$  of 48 = ?

17.  $24 \div 6 = ?$

4.  $36 \div 3 = ?$

11.  $15 \div 5 = ?$

18.  $48 \div 6 = ?$

5.  $\frac{1}{3}$  of 30 = ?

12.  $35 \div 5 = ?$

19.  $72 \div 6 = ?$

6.  $24 \div 4 = ?$

13.  $45 \div 5 = ?$

20.  $\frac{1}{8}$  of 54 = ?

7.  $32 \div 4 = ?$

14.  $60 \div 5 = ?$

## CHAPTER IV. NUMBERS OF THREE AND FOUR FIGURES

### 66. Numbers of Four Figures

Use sticks tied in bundles of 100 each. Count out ten bundles.

10 hundred equal 1 thousand.

Numbers in thousands are often needed to express facts. Our country is nearly three thousand miles across from east to west. The earth is about eight thousand miles through. There are over three thousand seconds in an hour, and over a thousand minutes in a day.

One thousand is written 1,000.

Three thousand is written 3,000.

Eight thousand is written 8,000.

One thousand, five hundred is written 1,500.

One thousand, three hundred twelve is written 1,312.

10

ten

100

one hundred

1,000

one thousand

1. How many figures are used in writing 10? In writing 100? In writing 1,000?

2. Read:

375	1,000	1,375	4,000	6,000
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283	2,000	1,283	4,800	6,500
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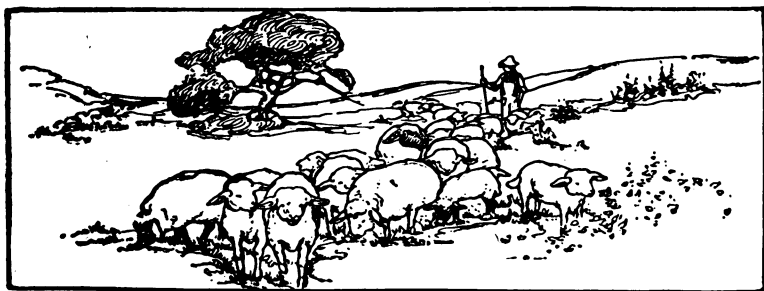
400	5000	1400	4834	6532
300	7000	1300	4034	6032
600	9000	2500	5075	9044

Do not use the word *and* in reading numbers like those above.

Write these numbers, using figures:

3. One hundred.
4. One thousand.
5. Eight hundred.
6. Eight thousand.
7. Five hundred.
8. Five thousand.
9. One thousand, five hundred.
10. Three thousand, eight hundred.
11. Six thousand, three hundred.
12. Nine thousand, four hundred eighty.
13. Eight thousand, six hundred thirty.
14. Seven thousand, five hundred seventy-five.

### 67. Making Two Changes in Subtraction



A farmer had 300 sheep and sold 124 of them. How many were left?



To find how many sheep were left, the number 124 is subtracted from 300.

First change

$$\begin{array}{r} 2\ 10 \\ 300 \\ \underline{124} \end{array}$$

Since 4 units cannot be taken from 0 units, 1 ten should be taken from the tens; but since there are no tens, 1 hundred is taken from the 300 and called 10 tens. This change makes 300 equal 2 hundred and 10 tens.

Second change

$$\begin{array}{r} 2\ 9\ 10 \\ 300 \\ \underline{124} \end{array}$$

A second change is then made. 1 ten is taken from the 10 tens and called 10 units, so that 300 is made to equal 2 hundred, 9 tens, and 10 units.

In subtracting, think of the 0 in units place as 10, the next 0 as 9 and the 3 as 2.

In taking 4 from 10, say: 6.

176 Difference

In taking 2 from 9, say: 7.

In taking 1 from 2, say: 1.

For the answer say: There are 176 sheep left.

When it is necessary to make a change in a number before subtracting, always *think* the change, without writing it out in figures.

[With pencil.]

1. Subtract 214 from 500. 321 from 600. 146 from 400.
2. Play that you are a farmer and have 200 cattle and send 114 away for pasture. How many would you have left?
3. Play that you raise 300 chickens and sell 238. Find the number left.
4. Play that you raise 500 bushels of corn and that you want to keep 240 bushels to feed to your stock. How many bushels could you sell?

<sup>1</sup> Directions for solving this problem by additive subtraction: Think of the 0 in units column as 10. Say: 4 and 6 are 10. Write the 6. Think of the 0 in tens column as 10 tens and the 2 tens as 3 tens. Say: 3 and 7 are 10. Write the 7. Think of the 1 hundred as 2 hundred. Say: 2 and 1 are 3. Write the 1.

First<sup>1</sup> think the changes in each number, then practice finding the differences:<sup>1</sup>

[With pencil.]

5. 400 124 <u>      </u>	6. 800 147 <u>      </u>	7. 500 258 <u>      </u>	8. 300 183 <u>      </u>	9. 700 332 <u>      </u>
10. 900 213 <u>      </u>	11. 800 624 <u>      </u>	12. 600 192 <u>      </u>	13. 700 255 <u>      </u>	14. 1000 243 <u>      </u>

In which of these problems must a number be changed before subtracting? Practice finding the differences.

15. 889 277 <u>      </u>	16. 672 146 <u>      </u>	17. 900 423 <u>      </u>	18. 700 136 <u>      </u>	19. 810 442 <u>      </u>
20. 746 322 <u>      </u>	21. 705 352 <u>      </u>	22. 371 120 <u>      </u>	23. 873 425 <u>      </u>	24. 800 532 <u>      </u>
25. 540 322 <u>      </u>	26. 413 244 <u>      </u>	27. 868 342 <u>      </u>	28. 736 178 <u>      </u>	29. 956 389 <u>      </u>
30. 676 232 <u>      </u>	31. 765 426 <u>      </u>	32. 682 355 <u>      </u>	33. 534 206 <u>      </u>	34. 607 324 <u>      </u>
35. \$4.54 3.27 <u>      </u>	36. \$5.37 2.25 <u>      </u>	37. \$5.00 3.41 <u>      </u>	38. \$6.10 1.43 <u>      </u>	39. \$8.05 4.32 <u>      </u>
40. \$9.76 4.42 <u>      </u>	41. \$7.06 3.28 <u>      </u>	42. \$9.62 5.43 <u>      </u>	43. \$6.28 3.72 <u>      </u>	44. \$5.45 2.36 <u>      </u>

<sup>1</sup> Pupils should practice solving problems of this type until the answers can be written without hesitation.

## 68. The Clerk

[With pencil.]

Play that you are a clerk in a toy store. Find, by subtracting, the amount of change due each of these children:

1. Fred buys a jackknife for 35¢ and hands you a dollar bill.

2. Tom buys a sled for \$1.25 and hands you a two-dollar bill.

3. Helen buys a doll for 85¢ and hands you a five-dollar bill.

4. Margaret buys a set of dishes for \$1.75 and hands you a two-dollar bill.

5. Robert buys skates for \$2.25 and hands you a five-dollar bill.

6. Frank buys a toy airship for 69¢ and hands you a two-dollar bill.

7. Henry buys a magic lantern for \$1.98 and hands you a ten-dollar bill.

Find the difference:

8. \$5.00 <u>1.75</u>	9. \$4.00 <u>2.50</u>	10. \$6.00 <u>1.50</u>	11. \$3.00 <u>2.50</u>	12. \$4.00 <u>2.75</u>
--------------------------	--------------------------	---------------------------	---------------------------	---------------------------

13. \$5.00 <u>3.50</u>	14. \$10.00 <u>5.50</u>	15. \$8.00 <u>3.75</u>	16. \$6.00 <u>4.25</u>	17. \$9.00 <u>8.25</u>
---------------------------	----------------------------	---------------------------	---------------------------	---------------------------

18. \$7.00 <u>4.75</u>	19. \$8.00 <u>6.50</u>	20. \$5.00 <u>1.80</u>	21. \$3.00 <u>2.45</u>	22. \$9.00 <u>6.43</u>
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## 69. Practice in Addition and Subtraction

Add:

[Without pencil.]

1. $\begin{array}{r} 20 \\ 30 \\ \hline \end{array}$	2. $\begin{array}{r} 40 \\ 20 \\ \hline \end{array}$	3. $\begin{array}{r} 30 \\ 40 \\ \hline \end{array}$	4. $\begin{array}{r} 40 \\ 50 \\ \hline \end{array}$	5. $\begin{array}{r} 300 \\ 200 \\ \hline \end{array}$	6. $\begin{array}{r} 400 \\ 300 \\ \hline \end{array}$
------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	--------------------------------------------------------	--------------------------------------------------------

7. $\begin{array}{r} 23 \\ 32 \\ \hline \end{array}$	8. $\begin{array}{r} 42 \\ 24 \\ \hline \end{array}$	9. $\begin{array}{r} 22 \\ 22 \\ \hline \end{array}$	10. $\begin{array}{r} 44 \\ 44 \\ \hline \end{array}$	11. $\begin{array}{r} 220 \\ 330 \\ \hline \end{array}$	12. $\begin{array}{r} 450 \\ 540 \\ \hline \end{array}$
------------------------------------------------------	------------------------------------------------------	------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

Subtract:

13. $\begin{array}{r} 40 \\ 20 \\ \hline \end{array}$	14. $\begin{array}{r} 50 \\ 30 \\ \hline \end{array}$	15. $\begin{array}{r} 60 \\ 20 \\ \hline \end{array}$	16. $\begin{array}{r} 90 \\ 30 \\ \hline \end{array}$	17. $\begin{array}{r} 800 \\ 400 \\ \hline \end{array}$	18. $\begin{array}{r} 700 \\ 300 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

19. $\begin{array}{r} 44 \\ 22 \\ \hline \end{array}$	20. $\begin{array}{r} 66 \\ 33 \\ \hline \end{array}$	21. $\begin{array}{r} 64 \\ 21 \\ \hline \end{array}$	22. $\begin{array}{r} 38 \\ 23 \\ \hline \end{array}$	23. $\begin{array}{r} 880 \\ 220 \\ \hline \end{array}$	24. $\begin{array}{r} 640 \\ 320 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------

Add:

[With pencil.]

25. $\begin{array}{r} 25 \\ 15 \\ \hline \end{array}$	26. $\begin{array}{r} 54 \\ 55 \\ \hline \end{array}$	27. $\begin{array}{r} 46 \\ 45 \\ \hline \end{array}$	28. $\begin{array}{r} 25 \\ 67 \\ \hline \end{array}$	29. $\begin{array}{r} 148 \\ 25 \\ \hline \end{array}$	30. $\begin{array}{r} 2190 \\ 1234 \\ \hline \end{array}$
-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------	--------------------------------------------------------	-----------------------------------------------------------

31. $\begin{array}{r} 321 \\ 455 \\ 324 \\ \hline \end{array}$	32. $\begin{array}{r} 214 \\ 321 \\ 423 \\ \hline \end{array}$	33. $\begin{array}{r} 142 \\ 323 \\ 145 \\ \hline \end{array}$	34. $\begin{array}{r} 313 \\ 245 \\ 544 \\ \hline \end{array}$	35. $\begin{array}{r} 1234 \\ 2434 \\ 1454 \\ \hline \end{array}$
----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------	----------------------------------------------------------------	-------------------------------------------------------------------

36. $\begin{array}{r} \$6.46 \\ 2.56 \\ 1.35 \\ \hline \end{array}$	37. $\begin{array}{r} \$5.65 \\ 2.43 \\ 1.54 \\ \hline \end{array}$	38. $\begin{array}{r} \$4.55 \\ 3.24 \\ 2.76 \\ \hline \end{array}$	39. $\begin{array}{r} \$3.42 \\ 1.45 \\ 6.56 \\ \hline \end{array}$	40. $\begin{array}{r} \$14.24 \\ 6.45 \\ 13.84 \\ \hline \end{array}$
---------------------------------------------------------------------	---------------------------------------------------------------------	---------------------------------------------------------------------	---------------------------------------------------------------------	-----------------------------------------------------------------------

Subtract:

41. $\begin{array}{r} \$8.83 \\ 6.66 \\ \hline \end{array}$	42. $\begin{array}{r} \$7.90 \\ 6.46 \\ \hline \end{array}$	43. $\begin{array}{r} \$8.29 \\ 6.45 \\ \hline \end{array}$	44. $\begin{array}{r} \$5.00 \\ 2.42 \\ \hline \end{array}$	45. $\begin{array}{r} \$10.00 \\ 3.74 \\ \hline \end{array}$
-------------------------------------------------------------	-------------------------------------------------------------	-------------------------------------------------------------	-------------------------------------------------------------	--------------------------------------------------------------

**70. The Number Seven in Addition and Subtraction<sup>1</sup>**

[Without pencil.]

- (1) First give sums down the columns, then practice giving them across the page.
- (2) Subtract the numbers in the same way — first down, then across.

	1.			2.			3.		
4.	7	8	9	11	13	12	14	15	16
	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
5.	17	18	19	21	23	22	24	25	26
	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
6.	37	48	69	51	43	72	84	95	46
	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
7.	27	58	39	41	63	82	94	75	66
	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>
8.	67	88	59	31	93	42	64	35	96
	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>

Add each column from the bottom up; test by adding down:

9.	4	5	7	7	10.	6	7	7	2
	<u>7</u>	<u>7</u>	<u>3</u>	<u>3</u>		<u>7</u>	<u>3</u>	<u>3</u>	<u>7</u>
	3	3	7	7		3	7	7	3
	<u>7</u>	<u>7</u>	<u>4</u>	<u>3</u>		<u>7</u>	<u>4</u>	<u>3</u>	<u>7</u>
	4	5	4	3		6	5	5	2
	<u>4</u>	<u>5</u>	<u>4</u>	<u>3</u>		<u>6</u>	<u>5</u>	<u>5</u>	<u>2</u>

<sup>1</sup> See footnotes, pages 44 and 54 of Part One.

Add and test:

[With pencil.]

11. 67	12. 24	13. 77	14. 35	15. 47	16. 26
73	77	73	77	73	77
37	33	37	33	37	33
74	47	74	57	73	77
64	54	75	55	43	26

## 71. The Number Seven in Multiplication and Division<sup>1</sup>

### I

[Without pencil.]

- How many days are there in a week? In 2 weeks?
- Find the sum of 3 sevens. Of 4 sevens.
- How many days are there in 3 weeks? In 4 weeks?
- Find the sum of 5 sevens. Of 6 sevens.
- Practice counting to 42 by seven.
- Complete:

1 seven is —.	$2 \times 7 = ?$	$? \times 7 = 7$	$7 \div 7 = ?$
2 sevens are —.	$4 \times 7 = ?$	$? \times 7 = 21$	$21 \div 7 = ?$
3 sevens are —.	$1 \times 7 = ?$	$? \times 7 = 14$	$14 \div 7 = ?$
4 sevens are —.	$3 \times 7 = ?$	$? \times 7 = 35$	$35 \div 7 = ?$
5 sevens are —.	$5 \times 7 = ?$	$? \times 7 = 28$	$28 \div 7 = ?$
6 sevens are —.	$6 \times 7 = ?$	$? \times 7 = 42$	$42 \div 7 = ?$

- Play you are making visits. How many days are you gone from home if you stay 3 weeks? If you stay 6 weeks?
- How many weeks are you away from home if you stay 14 days? If you stay 28 days?

<sup>1</sup> See footnote, page 27 of Part One.

9. Mary visited her grandmother 3 weeks and 5 days. How many days was she with her grandmother?

10. Tom stayed with his uncle on a farm 37 days. How many weeks was he there? How many days more than the even number of weeks?

11. Make a problem about a visit of 2 weeks and 5 days.

12. Make a problem about a visit 24 days long.

## II

[Use pencil only when needed.]

1. Add 7 sevens. What is their sum?

2. Find the sum of 8 sevens. Of 9 sevens. Of 10 sevens. Of 11 sevens. Of 12 sevens.

3. Practice counting by sevens from 7 to 84.

4. Practice giving answers to these tables:<sup>1</sup>

7 sevens are —.	$7 \times 7 = ?$	$? \times 7 = 56$	$56 \div 7 = ?$
8 sevens are —.	$9 \times 7 = ?$	$? \times 7 = 49$	$49 \div 7 = ?$
9 sevens are —.	$8 \times 7 = ?$	$? \times 7 = 70$	$70 \div 7 = ?$
10 sevens are —.	$11 \times 7 = ?$	$? \times 7 = 77$	$77 \div 7 = ?$
11 sevens are —.	$10 \times 7 = ?$	$? \times 7 = 63$	$63 \div 7 = ?$
12 sevens are —.	$12 \times 7 = ?$	$? \times 7 = 84$	$84 \div 7 = ?$

5. At 7¢ each, what is the cost of 8 sheets of cardboard? Of 12 sheets of drawing paper? Of 10 paint brushes?

6. Robert has 50 cents. How many drawing pencils can he buy at 7 cents apiece? What change should he receive?

<sup>1</sup> For completed tables see page 276.

7. If you divide 14 pieces of candy equally among 7 children, how many pieces will each receive?

8. What is  $\frac{1}{7}$  (one seventh) of 14? How is  $\frac{1}{7}$  of a number found?

9. What is  $\frac{1}{7}$  of 35¢?  $\frac{1}{7}$  of 70¢?  $\frac{1}{7}$  of \$21?  $\frac{1}{7}$  of \$84?

Find the quotients and remainders:

[With pencil.]

10.  $7 \overline{)15}$        $7 \overline{)24}$        $7 \overline{)43}$        $7 \overline{)37}$        $7 \overline{)30}$

11.  $7 \overline{)51}$        $7 \overline{)65}$        $7 \overline{)76}$        $7 \overline{)58}$        $7 \overline{)85}$

12. Multiply 71 by 5. 72 by 4. 70 by 6. 71 by 9. 70 by 8.

## 72. Review Game: Catching-the-Leader

A table like the one below is drawn upon a blackboard in plain sight of every one in the game. One child is chosen to be the leader. He points to the different problems in the table and calls upon his classmates one at a time to give the answers. If he notices a mistake, the child making it is "caught" and must go to the blackboard and write the problem with the correct answer. The leader has to be careful, however, not to get caught himself; for if he lets a mistake go by, he loses his place, and the child who notices that the answer is wrong has a chance to be leader.

To play the game, first study these problems:

$6 + 7 = ?$	$11 - 6 = ?$	$9 \times 3 = ?$	$18 \div 3 = ?$
$7 + 8 = ?$	$13 - 8 = ?$	$6 \times 4 = ?$	$45 \div 5 = ?$
$8 + 9 = ?$	$12 - 5 = ?$	$8 \times 4 = ?$	$32 \div 4 = ?$
$8 + 5 = ?$	$13 - 7 = ?$	$9 \times 6 = ?$	$48 \div 6 = ?$
$9 + 6 = ?$	$14 - 5 = ?$	$12 \times 6 = ?$	$84 \div 7 = ?$
$8 + 6 = ?$	$15 - 8 = ?$	$8 \times 7 = ?$	$63 \div 7 = ?$



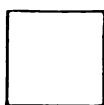
## 73. Finding Measurements



Triangle



Rectangle



Square

## I

1. How many sides has a triangle? A rectangle?

A rectangle with its four sides equal is called a **square**.

2. Draw a rectangle that is also a square.

3. Draw a rectangle that is not a square.

4. What is the shape of the United States flag?

5. Look for squares, for other rectangles, and for triangles about your schoolroom.

## II

A certain triangle is 2 inches on a side. How can the distance around it be found?

2 inches

3

6 inches

To find the distance around the triangle, 2 inches is taken 3 times; that is, 2 inches is multiplied by 3.

[Without pencil.]

1. Multiply 4 inches by 2. What is the answer?

2. Multiply 3 inches by 4. What is the answer?

4 inches  $\times$  2 may be read "2 times 4 inches" or "4 inches multiplied by 2."

12 ft.  $\times$  2 may be read "2 times 12 ft." or "12 ft. multiplied by 2."

Read in two ways; then give answers:

3. 4 inches  $\times$  5.      5. 6 feet  $\times$  2.      7. 7 yards  $\times$  2.

4. 8 inches  $\times$  2.      6. 3 feet  $\times$  10.      8. 5 miles  $\times$  3.

9. Tell how to find the distance around a triangle 8 inches on a side.

10. How is the distance around a square 4 inches on a side found?

11. Half the distance around a rectangle is 12 inches. How is the whole distance around it found?

12. Fred's garden is a square 10 feet on a side. What is the distance around it?

13. What is the distance around a flower bed in the shape of a triangle 6 feet on a side?

14. Mary's garden is a rectangle 4 feet wide and 8 feet long. What is the distance half way around it? (Make a drawing.) What is the whole distance around it?

#### 74. Naming the Answer in Multiplication

##### I

What is the distance around a square field 212 feet on a side?

$$\begin{array}{r} 212 \\ 4 \\ \hline 848 \end{array} \text{ Product}$$

To find the distance around the field, the number 212 is multiplied by 4. That is, the product of 212 and 4 is found.

The distance around the field is 848 feet.

An answer found by multiplying is called a **product**.

[With pencil.]

1. Multiply 121 by 4. What is the product?
2. Find the product of 122 and 3. Of 213 and 2.
3. Find the length of 2 telephone wires each 423 feet long.
4. Find the distance around a square garden 122 feet on a side.
5. How many yards is 3 times 72 yards?
6. Name the product for problem 3. For problem 4. For problem 5.
7. What number is the product when 42 inches is multiplied by 4?

## II

Find the products:

[Use pencil only when needed.]

$$\begin{array}{r} 1. \ 43 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 2. \ 243 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 3. \ 304 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 4. \ 1322 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 5. \ 2434 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 6. \ 23 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 7. \ 230 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 8. \ 322 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 9. \ 1302 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 10. \ 2330 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 11. \ 30 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 12. \ 202 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 13. \ 400 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 14. \ 1200 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 15. \ 2102 \\ \underline{3} \end{array}$$

$$\begin{array}{r} 16. \ 70 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 17. \ 512 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 18. \ 102 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 19. \ 2102 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 20. \ 2120 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 21. \ 54 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 22. \ 730 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 23. \ 842 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 24. \ 1324 \\ \underline{2} \end{array}$$

$$\begin{array}{r} 25. \ 4213 \\ \underline{2} \end{array}$$

**75. Finding Measurements (continued)**

**What is the total length of 2 sidewalks each 47 feet long?**

To find the length of the 2 sidewalks, the number 47 is multiplied by 2.

47

2

94 Product

Since 2 7's are 14, first say: 14.

Write the 4 in units place and keep the 1 in mind.

Since 2 4's with the 1 kept in mind make 9, next say: 9. Write the 9 in tens place.

In giving the answer, say: The product is 94. The length of the two sidewalks is 94 feet.

Caution: In multiplying 47 by 2, say these words only: 14, 9. The product is 94.

**Multiply:**

[With pencil.]

1. 17 in.

2

2. 28 ft.

2

3. 127 yd.

2

4. 223 mi.

4

5. What is the width of 3 building lots each 25 feet across?

6. What is the length of 2 boards each 36 inches long?

7. Find the distance around a square garden 38 feet on a side.

**76. Practice in Multiplication**

I

**Multiply:**

[With pencil.]

1. 14

2

2. 27

2

3. 24

3

4. 218

2

5. 125

3

6. 113

5

7. 16

2

8. 19

4

9. 13

5

10. 224

3

11. 225

2

12. 112

6

## II

242 multiplied by 3 equals how many?

242

3

726 Product

Since 3 2's are 6, for units place, say: 6.

Then, since 3 4's are 12, for tens place, say: 12.

Write the 2 in tens place. Keep the 1 in mind.

Next, since 3 2's with the 1 in mind make 7, for hundreds place, say: 7.

In giving the answer say: The product is 726.

Caution: In multiplying 242 by 3, say these words only: 6, 12, 7; the product is 726.

[Use pencil only when needed.]

Multiply:

1. 164 by 2.

4. 142 by 4.

7. 326 by 2.

2. 271 by 3.

5. 151 by 5.

8. 144 by 3.

3. 382 by 4.

6. 320 by 6.

9. 273 by 4.

10. Add:

11. Multiply:

12. Add:

13. Multiply:

12

12

20

20

12

3

20

4

12

20

20

14. What do you notice about the answers to problems 10 and 11? To problems 12 and 13?

15. Which is easier, to add three 12's or to multiply 12 by 3?

16. Which is easier, to add four 20's or to multiply 20 by 4?

Find answers first by addition and then by multiplication:

17. 3 times 40 = ?

19. 5 times 23 = ?

21. 4 times 42 = ?

18. 4 times 32 = ?

20. 2 times 36 = ?

22. 5 times 24 = ?

Multiply, testing products by multiplying a second time:

23. $\begin{array}{r} 46 \\ 4 \end{array}$	24. $\begin{array}{r} 273 \\ 5 \end{array}$	25. $\begin{array}{r} 264 \\ 4 \end{array}$	26. $\begin{array}{r} 1342 \\ 3 \end{array}$	27. $\begin{array}{r} 2745 \\ 2 \end{array}$
--------------------------------------------	---------------------------------------------	---------------------------------------------	----------------------------------------------	----------------------------------------------

28. $\begin{array}{r} 57 \\ 5 \end{array}$	29. $\begin{array}{r} 364 \\ 7 \end{array}$	30. $\begin{array}{r} 375 \\ 6 \end{array}$	31. $\begin{array}{r} 2432 \\ 4 \end{array}$	32. $\begin{array}{r} 4300 \\ 3 \end{array}$
--------------------------------------------	---------------------------------------------	---------------------------------------------	----------------------------------------------	----------------------------------------------

33. $\begin{array}{r} 67 \\ 6 \end{array}$	34. $\begin{array}{r} 447 \\ 7 \end{array}$	35. $\begin{array}{r} 536 \\ 4 \end{array}$	36. $\begin{array}{r} 3425 \\ 2 \end{array}$	37. $\begin{array}{r} 1205 \\ 7 \end{array}$
--------------------------------------------	---------------------------------------------	---------------------------------------------	----------------------------------------------	----------------------------------------------

### 77. Buying Groceries

What is the cost of 2 bags of flour at \$1.25 a bag?

$$\begin{array}{r} \$1.25 \\ 2 \\ \hline \end{array}$$

\$2.50 Product

In multiplying dollars and cents, before which two numbers is the dollar sign written?

How many places in the product are pointed off for cents?

Find the cost:

[With pencil.]

1. Of 4 pounds of butter at \$.64 a pound.
2. Of 3 pounds of tea at \$.75 a pound.
3. Of 2 pounds of coffee at \$.38 a pound.
4. Of 6 cans of fruit at \$.25 a can.
5. Of 4 bushels of potatoes at \$2.15 a bushel.
6. Of 2 barrels of flour at \$11.50 a barrel.

### 78. Review Exercise

[With pencil.]

- |                         |                                  |
|-------------------------|----------------------------------|
| 1. $243 + 256 + 46 = ?$ | 3. $\$7.42 + \$3.14 + \$.76 = ?$ |
| 2. $1238 + 2479 = ?$    | 4. $\$6.84 - \$3.78 = ?$         |

5.  $872 - 146 = ?$

8.  $\$5.00 - \$1.18 = ?$

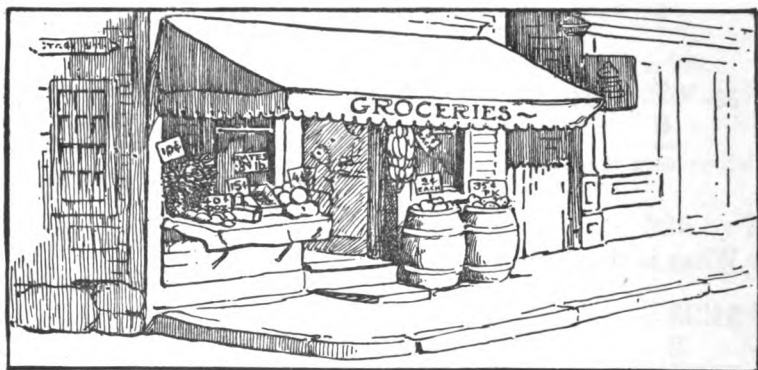
6.  $346 \times 2 = ?$

9.  $\$4.26 \times 2 = ?$

7.  $380 \times 3 = ?$

10.  $\$5.81 \times 4 = ?$

## 79. Buying Fruit



[Without pencil.]

1. Pineapples are selling at 20¢ each. How much must be paid for 2?

2. Lemons are selling at 60 cents a dozen. Find the cost of  $\frac{1}{2}$  dozen.

3. At 3 cents apiece, how much must be paid for 8 bananas?

4. William buys a basket of grapes for 15 cents, and some plums for 8 cents. He pays — cents.

5. John has 25 cents. He spends 17 cents for a pound of dates. How much money has he left?

6. Mary has 50 cents. She spends 20 cents for peaches and 10 cents for pears. Find how much she has left.

7. Oranges are selling at 4 cents apiece. How many can I buy for 50 cents? What change should I receive?

8. Play you have 25 cents to spend for fruit. Tell how you would spend it.

9. Make a problem about buying a dozen apples at 2 cents apiece.

10. Make a problem about buying  $\frac{1}{2}$  dozen bananas at 40 cents a dozen.

[With pencil.]

11. Apples are selling at \$4.25 a barrel. How can I find the cost of 3 barrels? What is the cost?

12. I buy a basket of pears for \$1.50, a basket of peaches for 75¢, and a dozen oranges for 35¢. How can I find how much I owe the fruit dealer? How much do I owe him?

13. John's father bought a box of oranges for \$4.25. He gave the clerk a five-dollar bill. How can you tell what change was due John's father? How much was the change?

14. Mrs. Brown bought 3 baskets of grapes at 24¢ a basket. How much did the grapes cost?

15. Mrs. Clarke bought a basket of peaches for \$2.50 and a basket of pears for \$1.80. The peaches cost how much more than the pears?

16. Find the cost of 6 dozen bananas at 38¢ a dozen.

17. Find the change from \$2.00 in buying fruit for \$1.24.

18. Make and solve a problem about buying oranges for 45¢ a dozen.



**80. The Number Eight in Addition and Subtraction <sup>1</sup>**

[Without pencil.]

- (1) Give sums down the columns, then across the page.  
 (2) Subtract in the same way — first down, then across.

	1.			2.			3.		
4.	8	9	12	14	17	15	16	11	13
	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>
5.	18	19	22	24	27	25	26	21	23
	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>
6.	38	49	52	74	67	85	96	51	73
	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>
7.	68	59	72	94	87	45	36	61	83
	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>

Add each column from the bottom up; test by adding down:

8.	5	8	8	6	9.	4	8	8	7
	<u>8</u>	<u>2</u>	<u>2</u>	<u>8</u>		<u>8</u>	<u>2</u>	<u>2</u>	<u>8</u>
	<u>2</u>	<u>8</u>	<u>8</u>	<u>2</u>		<u>2</u>	<u>8</u>	<u>8</u>	<u>2</u>
	<u>8</u>	<u>6</u>	<u>3</u>	<u>8</u>		<u>8</u>	<u>4</u>	<u>3</u>	<u>8</u>
	<u>5</u>	<u>3</u>	<u>4</u>	<u>6</u>		<u>4</u>	<u>5</u>	<u>2</u>	<u>7</u>

Add, then test:

[With pencil.]

10.	24	11.	35	12.	48	13.	53	14.	78	15.	47
	<u>88</u>		<u>88</u>		<u>82</u>		<u>88</u>		<u>82</u>		<u>88</u>
	<u>22</u>		<u>22</u>		<u>28</u>		<u>22</u>		<u>28</u>		<u>22</u>
	<u>48</u>		<u>88</u>		<u>63</u>		<u>88</u>		<u>84</u>		<u>88</u>
	<u>64</u>		<u>35</u>		<u>63</u>		<u>57</u>		<u>75</u>		<u>47</u>

<sup>1</sup> See footnotes, pages 44 and 54 of Part One.

# 81. The Number Eight in Multiplication and Division <sup>1</sup>

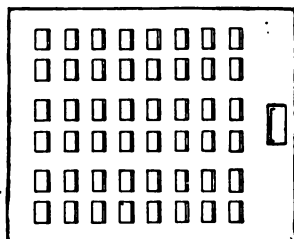
## I

[Without pencil.]

1. How many desks in each long row in this schoolroom?

2. Count the desks by the long rows.

3. Practice giving the answers to these tables:



$$1 \text{ eight is } \text{---}, \quad 2 \times 8 = ?, \quad ? \times 8 = 24, \quad 24 \div 8 = ?$$

$$2 \text{ eights are } \text{---}, \quad 4 \times 8 = ?, \quad ? \times 8 = 8, \quad 8 \div 8 = ?$$

$$3 \text{ eights are } \text{---}, \quad 1 \times 8 = ?, \quad ? \times 8 = 16, \quad 16 \div 8 = ?$$

$$4 \text{ eights are } \text{---}, \quad 3 \times 8 = ?, \quad ? \times 8 = 40, \quad 40 \div 8 = ?$$

$$5 \text{ eights are } \text{---}, \quad 5 \times 8 = ?, \quad ? \times 8 = 32, \quad 32 \div 8 = ?$$

$$6 \text{ eights are } \text{---}, \quad 6 \times 8 = ?, \quad ? \times 8 = 48, \quad 48 \div 8 = ?$$

4. When desks are placed 8 in a row, how many inkwells are needed for 2 of the rows? For 5 of the rows?

5. Robert's class fills 3 of the rows of desks. How many children are in his class, if each child sits alone?

6. How many children can find seats in 6 of the rows?

7. Books are to be passed to children in 4 of the rows. How many books are needed if 1 book is passed to each child?

8. Margaret has 40 pencils. To how many of the rows of children can she pass the pencils if she gives one to each child?

9. Make a problem about passing 32 sheets of paper.

<sup>1</sup> See footnote, page 27 of Part One.

## II

[Use pencil only when needed.]

1. Add 7 eights. What is their sum?
2. Find the sum of 8 eights. Of 9 eights. 10 eights. 11 eights. 12 eights.

3. Practice counting by eights from 8 to 96.

4. Practice giving the answers to these tables:

7 eights are —.	$7 \times 8 = ?$	$? \times 8 = 80$	$80 \div 8 = ?$
8 eights are —.	$10 \times 8 = ?$	$? \times 8 = 88$	$88 \div 8 = ?$
9 eights are —.	$11 \times 8 = ?$	$? \times 8 = 64$	$64 \div 8 = ?$
10 eights are —.	$8 \times 8 = ?$	$? \times 8 = 96$	$96 \div 8 = ?$
11 eights are —.	$9 \times 8 = ?$	$? \times 8 = 56$	$56 \div 8 = ?$
12 eights are —.	$12 \times 8 = ?$	$? \times 8 = 72$	$72 \div 8 = ?$

5. At 8 cents a yard, what is the cost of 8 yards of lace? Of 10 yards? Of 12 yards?

6. Buttons are selling at 8 cents a card. How much must I pay for 7 cards?

7. Pins are selling at 8 cents a paper. Find the price of 9 papers.

8. At 8 cents a spool, how many spools of silk thread can be bought for 64¢? For 80¢? For 90¢?

Find the quotients and remainders:

9. $8 \overline{)42}$	$8 \overline{)19}$	$8 \overline{)35}$	$8 \overline{)25}$	$8 \overline{)50}$
10. $8 \overline{)65}$	$8 \overline{)57}$	$8 \overline{)89}$	$8 \overline{)84}$	$8 \overline{)98}$

11. A line 16 inches long is divided into 8 equal parts. What is the length of one part or  $\frac{1}{8}$  (one eighth) of the line?

12. How is  $\frac{1}{4}$  of a number found? How is  $\frac{1}{8}$  found?

13. Find  $\frac{1}{8}$  of 24 inches.  $\frac{1}{8}$  of 48 feet.  $\frac{1}{8}$  of 80¢.  $\frac{1}{8}$  of \$32.

14. What is the product when 40 is multiplied by 2?

Find the product of:

[With pencil.]

15.  $84 \times 2$ .      20.  $28 \times 3$ .      25.  $108 \times 9$ .      30.  $528 \times 7$ .

16.  $81 \times 5$ .      21.  $18 \times 6$ .      26.  $281 \times 9$ .      31.  $218 \times 9$ .

17.  $83 \times 3$ .      22.  $48 \times 4$ .      27.  $308 \times 7$ .      32.  $408 \times 8$ .

18.  $80 \times 6$ .      23.  $38 \times 5$ .      28.  $681 \times 7$ .      33.  $228 \times 7$ .

19.  $82 \times 4$ .      24.  $58 \times 2$ .      29.  $118 \times 8$ .      34.  $181 \times 9$ .

## 82. Review

Copy and complete:

1.  $3 \times 4 = 2 \times \text{—}$ .

12.  $12 + 3 = 3 \times \text{—}$ .

2.  $4 \times 4 = 8 \times \text{—}$ .

13.  $18 + 6 = 3 \times \text{—}$ .

3.  $10 \times 2 = 5 \times \text{—}$ .

14.  $30 + 2 = 4 \times \text{—}$ .

4.  $12 \times 2 = 4 \times \text{—}$ .

15.  $25 + 3 = 4 \times \text{—}$ .

5.  $6 \times 3 = 9 \times \text{—}$ .

16.  $42 + 6 = 6 \times \text{—}$ .

6.  $3 \times 8 = 4 \times \text{—}$ .

17.  $53 - 4 = 7 \times \text{—}$ .

7.  $10 \times 3 = 5 \times \text{—}$ .

18.  $42 - 7 = 5 \times \text{—}$ .

8.  $12 \times 3 = 6 \times \text{—}$ .

19.  $69 - 6 = 9 \times \text{—}$ .

9.  $12 \times 4 = 6 \times \text{—}$ .

20.  $70 - 6 = 8 \times \text{—}$ .

10.  $10 \times 4 = 5 \times \text{—}$ .

21.  $\frac{1}{4}$  of 40 =  $2 \times \text{—}$ .

11.  $12 \times 5 = 6 \times \text{—}$ .

22.  $\frac{1}{2}$  of 20 =  $5 \times \text{—}$ .

23. Make other puzzles like these for your classmates.

## 83. Practice in Uneven Division

Find the quotients and remainders:

[Without pencil.]

- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. $2\overline{)12}$  | 2. $2\overline{)16}$  | 3. $3\overline{)9}$   | 4. $3\overline{)21}$  | 5. $3\overline{)27}$  |
| $2\overline{)13}$     | $2\overline{)17}$     | $3\overline{)11}$     | $3\overline{)22}$     | $3\overline{)29}$     |
| 6. $4\overline{)4}$   | 7. $4\overline{)20}$  | 8. $4\overline{)32}$  | 9. $4\overline{)28}$  | 10. $4\overline{)36}$ |
| $4\overline{)7}$      | $4\overline{)21}$     | $4\overline{)35}$     | $4\overline{)29}$     | $4\overline{)39}$     |
| 11. $5\overline{)25}$ | 12. $5\overline{)30}$ | 13. $5\overline{)45}$ | 14. $5\overline{)15}$ | 15. $5\overline{)55}$ |
| $5\overline{)27}$     | $5\overline{)34}$     | $5\overline{)48}$     | $5\overline{)19}$     | $5\overline{)59}$     |
| 16. $6\overline{)6}$  | 17. $6\overline{)18}$ | 18. $6\overline{)30}$ | 19. $6\overline{)36}$ | 20. $6\overline{)42}$ |
| $6\overline{)11}$     | $6\overline{)21}$     | $6\overline{)35}$     | $6\overline{)39}$     | $6\overline{)44}$     |
| 21. $7\overline{)21}$ | 22. $7\overline{)28}$ | 23. $7\overline{)35}$ | 24. $7\overline{)49}$ | 25. $7\overline{)42}$ |
| $7\overline{)25}$     | $7\overline{)30}$     | $7\overline{)39}$     | $7\overline{)50}$     | $7\overline{)46}$     |
| 26. $8\overline{)8}$  | 27. $8\overline{)16}$ | 28. $8\overline{)40}$ | 29. $8\overline{)32}$ | 30. $8\overline{)48}$ |
| $8\overline{)13}$     | $8\overline{)17}$     | $8\overline{)45}$     | $8\overline{)36}$     | $8\overline{)50}$     |

Complete, making pairs of problems like those above:

- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 31. $4\overline{)20}$ | 32. $5\overline{)35}$ | 33. $6\overline{)24}$ | 34. $7\overline{)14}$ | 35. $8\overline{)24}$ |
| $4\overline{) \quad}$ | $5\overline{) \quad}$ | $6\overline{) \quad}$ | $7\overline{) \quad}$ | $8\overline{) \quad}$ |

Make other pairs of problems for your classmates to solve.

## CHAPTER V. NUMBERS OF THREE AND FOUR FIGURES (continued)

### 84. Marching



#### I

[Without pencil.]

1. This class contains 48 children marching 4 abreast. How many 4's are there? How can the number of 4's be found without counting?

2. Explain how to find the number of 2's when 20 children march 2 abreast. How many 2's are there?

3. A class of 44 children is to march 4 abreast. How many 4's will there be?

4. A school of 80 children is to march 8 abreast. Find how many 8's there will be.

## II

How many 2's are there when 268 children march 2 abreast?

To find how many 2's there are, the number 268 is divided by 2.<sup>1</sup>

$\begin{array}{r} 134 \text{ Quotient} \\ 2 \overline{)268} \end{array}$	<p>To divide, we first ask, "How many 2's in 2?"          The answer 1, we write above the 2.          Next we ask, "How many 2's in 6?" The answer          3, we write above the 6.          Last we ask, "How many 2's in 8?" The answer          4, we write above the 8.  <math>268 \div 2 = 134</math>. The number of 2's in the march is          134.</p>
--------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

To show what the name of each figure in the quotient is, this explanation is given:

2 is contained in 2 hundred, 1 hundred times. Since the 1 is 1 hundred, it is written above the 2 in hundreds place.

2 is contained in 6 tens, 3 tens times. Since the 3 is 3 tens, it is written above the 6 in the place for tens.

2 is contained in 8 units, 4 units times. Since the 4 is 4 units, it is written above the 8 in the place for units.

$$268 \div 2 = 134.$$

[With pencil.]

1. Divide 936 by 3.
2. Divide 846 by 2, explaining how each figure in the quotient gets its name.
3. In a parade there were 484 soldiers marching 4 abreast. How many 4's were there?
4. Find how many 3's there are when 96 children form 3 abreast.

<sup>1</sup> After the process of division is understood, both speed and accuracy will be gained if the children are trained to divide with as few words in mind as possible. The first way given above may be cut to: "2's in 2, 1. 2's in 6, 3. 2's in 8, 4.  $268 \div 2 = 134$ ."

5. Find how many 2's there are when 840 men march 2 abreast.

Find the quotients:

- |                       |                       |                        |                        |                        |
|-----------------------|-----------------------|------------------------|------------------------|------------------------|
| 6. $2\overline{)48}$  | 7. $2\overline{)68}$  | 8. $2\overline{)862}$  | 9. $2\overline{)808}$  | 10. $2\overline{)860}$ |
| 11. $3\overline{)69}$ | 12. $3\overline{)93}$ | 13. $3\overline{)360}$ | 14. $3\overline{)693}$ | 15. $3\overline{)309}$ |
| 16. $4\overline{)84}$ | 17. $4\overline{)88}$ | 18. $4\overline{)840}$ | 19. $4\overline{)404}$ | 20. $4\overline{)804}$ |

### 85. Setting out Plants

Rose bushes are to be set out on the side of a flower garden 76 feet long. How many bushes are needed if a space of 2 feet is allowed each bush?

To find how many bushes are needed, the number 76 is divided by 2.

<p>38 Quotient</p> <p><math>2\overline{)76}</math></p>	<p>2 is contained in 7, 3 times with 1 remainder. The 3 is written above the 7.</p> <p>Since the 7 is 7 tens, the 1 remainder is 1 ten. The remainder 1 ten is added to the 6 units. <math>10+6=16</math>.</p> <p>2 is contained in 16, 8 times. The 8 is written above the 6.</p>
--------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

$$76 \div 2 = 38.$$

The number of rose bushes needed is 38.

[With pencil.]

1. Divide 94 by 2.      78 by 3.      96 by 4.
2. A row in Fred's garden 58 feet long is to be filled with cabbage plants set so that each plant has a space of 2 feet. How many cabbage plants are needed?
3. How many tomato plants can be set in a row 72 feet long, if 3 feet of space is given to each plant?
4. Find how many bushes can be set in a row 92 feet long, if 4 feet of space is given to each bush.



## 86. Practice in Division

## I

Find the quotients:

[With pencil.]

- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. $2\overline{)54}$  | 2. $5\overline{)65}$  | 3. $3\overline{)42}$  | 4. $4\overline{)64}$  | 5. $5\overline{)75}$  |
| 6. $3\overline{)48}$  | 7. $2\overline{)36}$  | 8. $3\overline{)45}$  | 9. $4\overline{)68}$  | 10. $5\overline{)70}$ |
| 11. $4\overline{)56}$ | 12. $2\overline{)78}$ | 13. $3\overline{)51}$ | 14. $4\overline{)72}$ | 15. $5\overline{)85}$ |

## II

What is the quotient when 141 is divided by 3?

$$\begin{array}{r} 47 \text{ Quotient} \\ 3\overline{)141} \end{array}$$

Since 1 cannot be divided by 3, the next figure is used with it.

$14 \div 3 = 4$  with a remainder of 2.

The remainder 2 is called 2 tens and added to the next figure. 2 tens + 1 = 21.

$21 \div 3 = 7$ .

The quotient is 47.

Find the quotients:

[With pencil.]

- |                        |                        |                        |                        |                        |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1. $2\overline{)128}$  | 2. $2\overline{)132}$  | 3. $3\overline{)156}$  | 4. $3\overline{)162}$  | 5. $3\overline{)219}$  |
| 6. $4\overline{)124}$  | 7. $4\overline{)136}$  | 8. $5\overline{)155}$  | 9. $5\overline{)160}$  | 10. $6\overline{)186}$ |
| 11. $7\overline{)147}$ | 12. $7\overline{)210}$ | 13. $7\overline{)224}$ | 14. $8\overline{)168}$ | 15. $8\overline{)176}$ |

## III

What is the quotient when 729 is divided by 3?

$$\begin{array}{r} 243 \text{ Quotient} \\ 3\overline{)729} \end{array}$$

$7 \div 3 = 2$  with 1 remainder.

The 1 remainder (1 hundred) is called 10 tens and added to the 2 tens. 10 tens and 2 tens = 12 tens.

$12 \div 3 = 4$ .  $9 \div 3 = 3$ .

The quotient is 243.

Divide:

[With pencil.]

- |              |               |               |
|--------------|---------------|---------------|
| 1. 542 by 2. | 6. 528 by 4.  | 11. 726 by 6. |
| 2. 324 by 2. | 7. 532 by 4.  | 12. 952 by 4. |
| 3. 426 by 3. | 8. 754 by 2.  | 13. 665 by 5. |
| 4. 554 by 2. | 9. 984 by 2.  | 14. 732 by 3. |
| 5. 452 by 4. | 10. 672 by 3. | 15. 852 by 6. |

## IV

- (1)  $240 \div 2 = ?$       (2)  $318 \div 3 = ?$       (3)  $173 \div 2 = ?$

$$\begin{array}{r} 120 \\ 2 \overline{)240} \end{array}$$

$$\begin{array}{r} 106 \\ 3 \overline{)318} \end{array}$$

$$\begin{array}{r} 86\frac{1}{2} \\ 2 \overline{)173} \end{array}$$

Notice that in problems (1) and (2) a zero is written in the quotient when a number is contained *no times*.

Notice that in problem 3 the remainder 1 from units column is written in the quotient, above the number by which the division was made.

Divide:

[With pencil.]

- |              |                |                |
|--------------|----------------|----------------|
| 1. 360 by 3. | 9. 327 by 3.   | 17. 619 by 6.  |
| 2. 408 by 2. | 10. 612 by 6.  | 18. 709 by 7.  |
| 3. 800 by 4. | 11. 804 by 4.  | 19. 1500 by 2. |
| 4. 300 by 2. | 12. 1200 by 2. | 20. 4520 by 4. |
| 5. 520 by 4. | 13. 1500 by 5. | 21. 6720 by 3. |
| 6. 552 by 5. | 14. 700 by 2.  | 22. 5650 by 5. |
| 7. 120 by 3. | 15. 909 by 3.  | 23. 3721 by 3. |
| 8. 900 by 3. | 16. 526 by 5.  | 24. 453 by 4.  |
- 
- |                       |                       |
|-----------------------|-----------------------|
| 25. $808 \div 2 = ?$  | 28. $1320 \div 4 = ?$ |
| 26. $900 \div 6 = ?$  | 29. $7140 \div 7 = ?$ |
| 27. $6090 \div 3 = ?$ | 30. $7500 \div 2 = ?$ |

## 87. Review — Finding an Equal Part

I [Use pencil only when needed.]

1. Six apples are to be divided between 2 children equally. What part is each to get? How many apples will each have?

2. How is one half of a number found?

3. Explain how to find  $\frac{1}{2}$  of 12 oranges;  $\frac{1}{2}$  of 42 pencils;  $\frac{1}{2}$  of 600 sheets of paper.

4.  $84 \div 2 = ?$                        $76 \div 2 = ?$                        $842 \div 2 = ?$

$\frac{1}{2}$  of 84 = ?                       $\frac{1}{2}$  of 76 = ?                       $\frac{1}{2}$  of 842 = ?

5. Fifteen pennies are to be divided equally among 3 boys. What part is each to get? How many pennies will each have?

6. How is one third of a number found?

7. Explain how to find  $\frac{1}{3}$  of 6 books;  $\frac{1}{3}$  of 30 cents;  $\frac{1}{3}$  of \$360.

8. How is  $\frac{1}{4}$  of a number found? How is  $\frac{1}{5}$  of a number found? How is  $\frac{1}{6}$  found?  $\frac{1}{7}$ ?  $\frac{1}{8}$ ?

9. Explain how to find  $\frac{1}{4}$  of 8 pieces of candy;  $\frac{1}{8}$  of 80 pieces of chalk;  $\frac{1}{6}$  of \$480.

Find:

10.  $\frac{1}{2}$  of 422.

14.  $\frac{1}{3}$  of 96.

18.  $\frac{1}{4}$  of 88.

11.  $\frac{1}{2}$  of 672.

15.  $\frac{1}{3}$  of 72.

19.  $\frac{1}{4}$  of 92.

12.  $\frac{1}{2}$  of 360.

16.  $\frac{1}{3}$  of 129.

20.  $\frac{1}{6}$  of 168

13.  $\frac{1}{2}$  of 500.

17.  $\frac{1}{5}$  of 165.

21.  $\frac{1}{8}$  of 216.

22. Find  $\frac{1}{5}$  of 250 pounds;  $\frac{1}{6}$  of 180 yards;  $\frac{1}{8}$  of 808 miles.

## II

Two dollars and a half is to be divided equally between 2 children. How much will each receive?

To find each child's share, \$2.50 is divided by 2.

$$\begin{array}{r} \$1.25 \\ 2 \overline{) \$2.50} \end{array}$$

In finding a part of a number of dollars and cents, how many places are pointed off for cents? Where is the dollar sign written?

Find:

[With pencil.]

- |                             |                              |                              |
|-----------------------------|------------------------------|------------------------------|
| 1. $\frac{1}{2}$ of \$4.80. | 4. $\frac{1}{3}$ of \$9.60.  | 7. $\frac{1}{4}$ of \$8.40.  |
| 2. $\frac{1}{2}$ of \$5.40. | 5. $\frac{1}{3}$ of \$12.00. | 8. $\frac{1}{5}$ of \$13.20. |
| 3. $\frac{1}{2}$ of \$5.00. | 6. $\frac{1}{6}$ of \$7.20.  | 9. $\frac{1}{8}$ of \$9.60.  |

## 88. Review of United States Money

Add:

[With pencil.]

1. \$8.46	2. \$1.35	3. \$2.04	4. \$12.00
3.20	1.24	3.50	3.42
<u>2.48</u>	<u>3.02</u>	<u>1.48</u>	<u>1.48</u>

Subtract:

5. \$8.46	6. \$5.62	7. \$4.25	8. \$5.00	9. \$6.00
<u>2.21</u>	<u>3.14</u>	<u>1.82</u>	<u>3.28</u>	<u>1.34</u>

Multiply:

10. \$3.24	11. \$2.25	12. \$1.44	13. \$3.50	14. \$1.75
<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>

Divide:

15. $2 \overline{) \$4.40}$	16. $2 \overline{) \$8.70}$	17. $3 \overline{) \$6.60}$	18. $4 \overline{) \$5.20}$
-----------------------------	-----------------------------	-----------------------------	-----------------------------

Find answers:

19.  $\$4.24 + \$3.14 + \$1.25 = ?$

23.  $\$5.00 - \$3.20 = ?$

20.  $\$6.40 - \$3.80 = ?$

24.  $\$2.40 + 88¢ = ?$

21.  $2 \times \$1.48 = ?$

25.  $4 \times \$1.60 = ?$

22.  $\$5.60 \div 2 = ?$

26.  $\frac{1}{4}$  of  $\$7.20 = ?$

### 89. Earning Money

[With pencil.]

First tell how to find the answers to these problems; then find them:

1. Helen has been promised a doll carriage costing \$2.50 if she earns  $\frac{1}{2}$  of the money. How much money must she earn?

2. Fred has earned \$1.35 toward buying a pair of roller skates costing \$1.60. How much more must he earn?

3. Ruth wants to buy a set of dishes costing 75 cents. She saves 3 cents a day. How many days will it take her to save the money?

4. In one summer John earned \$4.25 from his chickens and \$2.50 from his garden. How much did he earn in all?

5. Robert earns \$.75 a week helping his father. How much does he earn in a month of 4 weeks?

6. After earning \$5.00, William spent \$2.40 for a magic lantern. How much of his money did he have left?

7. Henry earned \$2.40 helping his father, and \$1.90 helping his mother. Out of this money he spent \$3.00. Find how much money he had left.

# 90. The Number Nine in Addition and Subtraction<sup>1</sup>

[Without pencil.]

(1) Give sums down the columns, then across the page.

(2) Subtract in the same way — first down, then across.

	1.				2.				3.		
4.	9	11	13		12	14	15		17	16	18
	9	9	9		9	9	9		9	9	9
	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>
5.	19	21	23		22	24	25		27	26	28
	9	9	9		9	9	9		9	9	9
	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>
6.	39	41	33		52	44	35		47	56	38
	9	9	9		9	9	9		9	9	9
	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>
7.	69	71	63		82	94	75		87	76	98
	9	9	9		9	9	9		9	9	9
	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>

Add each column from the bottom up; test by adding down:

8.	9	9	9	9	9.	9	9	9	9
	5	6	5	6		3	7	8	9
	9	9	9	9		9	9	9	4
	4	5	6	7		2	8	3	5
	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>

Add and test:

[With pencil.]

10.	69	11.	79	12.	69	13.	69	14.	99	15.	59
	95		91		96		95		56		95
	16		19		15		16		65		16
	49		42		59		59		99		99
	64		72		65		66		47		58
	<u>  </u>		<u>  </u>		<u>  </u>		<u>  </u>		<u>  </u>		<u>  </u>

See footnote, page 26 of Part One.

**91. The Number Nine in Multiplication and Division<sup>1</sup>**

[Use pencil only when needed.]

**1.** Build the table of nines by addition.**2.** What do you notice about the table?**3.** Find answers:

$1 \times 9 = ?$	$7 \times 9 = ?$	$18 \div 9 = ?$	$72 \div 9 = ?$
$2 \times 9 = ?$	$8 \times 9 = ?$	$9 \div 9 = ?$	$63 \div 9 = ?$
$3 \times 9 = ?$	$9 \times 9 = ?$	$27 \div 9 = ?$	$90 \div 9 = ?$
$4 \times 9 = ?$	$10 \times 9 = ?$	$45 \div 9 = ?$	$81 \div 9 = ?$
$5 \times 9 = ?$	$11 \times 9 = ?$	$36 \div 9 = ?$	$99 \div 9 = ?$
$6 \times 9 = ?$	$12 \times 9 = ?$	$54 \div 9 = ?$	$108 \div 9 = ?$

**4.** How many men form a baseball team? How many are there in 2 nines? In 3 nines?**5.** Make other problems about baseball teams.

Find answers:

[With pencil.]

<b>6.</b> $92 \times 4 = ?$	<b>11.</b> $109 \times 9 = ?$	<b>16.</b> $189 \div 9 = ?$
<b>7.</b> $93 \times 2 = ?$	<b>12.</b> $209 \times 8 = ?$	<b>17.</b> $468 \div 9 = ?$
<b>8.</b> $90 \times 6 = ?$	<b>13.</b> $119 \times 7 = ?$	<b>18.</b> $360 \div 9 = ?$
<b>9.</b> $91 \times 7 = ?$	<b>14.</b> $390 \times 8 = ?$	<b>19.</b> $297 \div 9 = ?$
<b>10.</b> $92 \times 5 = ?$	<b>15.</b> $490 \times 7 = ?$	<b>20.</b> $765 \div 9 = ?$

**21.** How is  $\frac{1}{8}$  of a number found? How is  $\frac{1}{9}$  (one ninth) found?**22.** Find  $\frac{1}{9}$  of 990. Of 675. Of 810. Of 729.

<sup>1</sup> One peculiarity of the table of 9's that is not often noticed is that the sum of the digits in each product up to  $11 \times 9$  is 9. In 18, for example,  $1+8=9$ ; in 27,  $2+7=9$ .

## 92. At a Flower Stand



[Without pencil.]

How many quarters are given for a half-dollar? How many dimes? How many nickels? How many cents?

Play that you are a clerk at a flower stand and that each of the children named below hands you a half-dollar. Tell how much money you would give each in change:

1. Fred buys a geranium for 25¢.
2. Margaret buys a bunch of violets for 20¢.
3. Robert buys some Christmas holly for 30¢.
4. John buys a Christmas wreath for 15¢.
5. Gertrude buys 8 white roses at 5¢ apiece.
6. Clara buys 6 red roses at 4¢ apiece.
7. Frank buys 12 carnations at 3¢ apiece.
8. Arthur buys 2 bunches of daisies at 10¢ each.
9. Helen buys 3 ferns at 10¢ apiece.
10. Henry buys 4 umbrella plants at 10¢ each.



**93. Counting Change to a Dollar <sup>1</sup>**

[Without pencil.]

1. If you were to take a dollar bill to a grocer and ask him to give you quarters for it, how many quarters would he give you?

2. With the help of coins, count out quarters enough to make a dollar. Count out half-dollars enough. Dimes enough. Nickels enough.

Fill blanks:

3. 1 dollar equals — half-dollars.
4. 1 dollar equals — quarters.
5. 1 dollar equals — dimes.
6. 1 dollar equals — nickels.

Find the amount of money that should be put with each of the following to make a dollar:

- |                     |                                       |
|---------------------|---------------------------------------|
| 7. With 1 quarter.  | 12. With 10 nickels.                  |
| 8. With 2 quarters. | 13. With a half-dollar and 1 dime.    |
| 9. With 3 quarters. | 14. With a half-dollar and 4 nickels. |
| 10. With 5 dimes.   | 15. With a half-dollar and 1 quarter. |
| 11. With 9 dimes.   | 16. With a quarter and 2 dimes.       |

Count out with coins the sum of money that should be received as change from 1 dollar in buying:

- |                              |                               |
|------------------------------|-------------------------------|
| 17. A baseball for 75¢.      | 20. A doll for 60¢.           |
| 18. A set of dishes for 50¢. | 21. A pair of skates for 85¢. |
| 19. A story book for 90¢.    | 22. A game for 40¢.           |

<sup>1</sup> Use real coins for this exercise, if possible; if not, substitute toy money.

94. Review

[With pencil.]

1.  $\$2.15 + \$3.24 + \$4.16 = ?$
2.  $\$5.14 + \$1.70 + \$2.35 + \$4.36 = ?$
3.  $\$4.15 + \$24.00 + \$25.65 = ?$
4.  $\$3.25 + \$.44 + \$.36 + \$.53 = ?$
5.  $\$4.24 + \$3.25 + \$1.64 + \$.45 + \$.35 = ?$
6.  $\$9.40 - \$3.20 = ?$
7.  $\$8.75 - \$5.45 = ?$
8.  $\$9.00 - \$2.64 = ?$
9.  $\$5.00 - \$3.14 = ?$
10.  $\$10.00 - \$4.23 = ?$
11.  $\$4.80 \times 2 = ?$
12.  $\$8.75 \times 5 = ?$
13.  $\$2.48 \times 6 = ?$
14.  $\$4.80 \div 2 = ?$
15.  $\$6.75 \div 3 = ?$
16.  $\$12.84 \div 4 = ?$
17.  $\$7.75 \div 5 = ?$
18.  $\frac{1}{2}$  of  $\$9.40 = ?$
19.  $\frac{1}{3}$  of  $\$7.80 = ?$
20.  $\frac{1}{6}$  of  $\$8.40 = ?$
21.  $\frac{1}{8}$  of  $\$9.60 = ?$

95. Buying Dry Goods

Find the cost:

[Without pencil.]

1. Of 4 papers of pins at 8¢ a paper.
2. Of 12 spools of thread at 5¢ a spool.
3. Of 2 needlebooks at 20¢ each.
4. Of hairpins at 20¢, hooks at 15¢, and yarn at 10¢.
5. Of tape at 15¢ and braid at 10¢.
6. Of 2 yards of lace at 9¢ a yard, and 1 spool of silk at 8¢.
7. Of 6 balls of cotton at 8¢ a ball and 1 paper of darning needles at 9¢.

8. Of 3 yards of muslin at 10¢ a yard, and 2 yards of baby ribbon at 3¢ a yard.

Find the change:

9. From 50¢ in buying a collar for 25¢.
10. From \$1.00 in buying an apron for 75¢.
11. From 25¢ in buying 2 cards of buttons at 9¢ a card.
12. From 50¢ in buying 4 yards of lace at 6¢ a yard.
13. From \$1.00 in buying 12 yards of ribbon at 8¢ a yard.
14. At 5¢ a spool, how many spools of thread can be bought for 35¢? For 45¢?
15. At 8¢ a card, how many cards of buttons can be bought for 50¢? What change would be received?
16. At 6¢ a roll, how many rolls of braid can be bought for 75¢? What change would be received?  
[With pencil.]
17. Ruth had \$3.60 and spent  $\frac{1}{3}$  of it for a new hat. How much did the new hat cost?
18. John bought a sweater for \$6.60, a pair of shoes for \$6.50, and a cap for 50¢. How much did he owe?
19. Margaret bought 2 summer dresses at \$3.98 each. Find how much the dresses cost.
20. Fred bought a suit for \$8.50 and an overcoat for \$9.00. The overcoat cost how much more than the suit?
21. Mary had \$10.00. She spent \$7.25 for a cloak and 50 cents for a hair ribbon. How much was left?
22. Make and solve a problem about buying dry goods.

## 96. Roman Numbers

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	2	3	4	5	6	7	8	9	10	11	12

1. What are the figures called that are commonly used to mark the hours on a clock face?

2. Name other places where Roman numbers are used.

3. What letter stands for one? For five? For ten?

In reading Roman numbers in which the figure at the left has the same value as the one at the right, or is greater in value, the figures are *added*.

$$II = 1 + 1$$

$$VI = 5 + 1$$

$$XII = 10 + 1 + 1$$

4. Complete:

III = ?	XI = ?	XV = ?	XX = ?	XXX = ?
VI = ?	XII = ?	XVII = ?	XXI = ?	XXXV = ?
VIII = ?	XIII = ?	XVIII = ?	XXV = ?	XXXVI = ?

When the figure at the left is less in value than the one at the right, the figures are *subtracted*.

$$IV = 1 \text{ from } 5.$$

$$IX = 1 \text{ from } 10.$$

5. Complete:

XIV = 10 + ?	XXIV = 20 + ?	XXXIV = ?
XIX = 10 + ?	XXIX = 20 + ?	XXXIX = ?

6. Write in Roman numerals:

2	11	19	25	31
5	16	22	26	37
7	17	24	29	34

L = 50

7. Read:

LI	LVII	XL	XLV	XLIV
LV	LX	XLI	XLVI	XLIX

8. Write in Roman numerals:

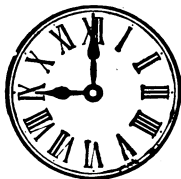
42	43	46	44	49	50	55
----	----	----	----	----	----	----

**97. Telling the Hour by a Clock**

[Without pencil.]

1. How many hours are marked on the clock face? Name them.

2. Which hand marks the hours? Which one marks the minutes?



3. Where is the hour hand when it is 9 o'clock in the morning — time for school to begin?

4. Where is the hour hand at 12 o'clock — time for the morning session to close?

5. Robert has his supper at 6 o'clock. Where is the hour hand at that time?

6. Helen goes to bed at 8 o'clock. How can Helen tell from the clock when it is time for her to go?

7. With the minute hand at XII, what time is it when the hour hand is at I? At III? At VII? At XI?

8. Set the hands of a clock to show that it is 7 o'clock — time to get up in the morning.

9. Set the hands at 8 o'clock — time for breakfast.

10. Set the hands at 12 o'clock — noon.
11. Set the hands at 4 o'clock — time in the afternoon for play.
12. Make of heavy paper a clock face 2 inches across. Write the Roman numerals on the face and use a bent pin for the hour hand. Then practice setting the hour hand to show different hours of the day.

### 98. The Hour and the Day

[Without pencil.]

1. How many times a day does the hour hand go around the clock face?

2. How many hours are there in one day, counting the night as part of the day?

**24 hours = 1 day.**

3. How many hours of daylight in a summer day when the night is 8 hours long?

4. In winter, the hours of daylight are fewer than in summer. How many hours of daylight in a winter's day when the night is 14 hours long?

5. Tom goes to sleep at 8 o'clock in the evening and wakens at 6 o'clock in the morning. How many hours out of each 24 is Tom asleep? How many hours is he awake?

6. Margaret spends 10 hours each night in sleep, 5 hours each day at school, and 1 hour eating her meals. How many hours has she left, out of each 24 hours, for work and play?

7. Margaret's father works from 8 o'clock in the morning

until 12 o'clock at noon, and from 1 o'clock until 5 o'clock.  
How many hours does he work each day?

Find how many hours there are:

8. From 7 o'clock in the morning until 12 o'clock noon.
9. From 6 o'clock in the morning until 11 o'clock in the morning.
10. From 11 o'clock in the morning until 2 o'clock in the afternoon.
11. From 11 o'clock in the morning until 7 o'clock in the afternoon.
12. From 10 o'clock in the morning until 3 o'clock in the afternoon.
13. From 8 o'clock in the morning until 5 o'clock in the afternoon.

### 99. The Half-Hour and the Quarter-Hour



12 o'clock



Quarter past  
12 o'clock



Half past  
12 o'clock

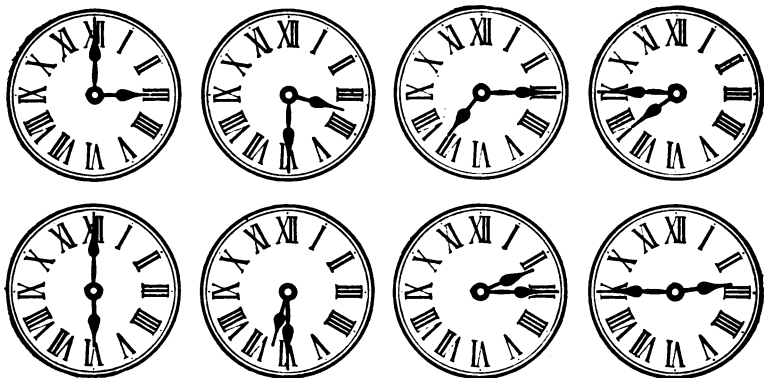


Quarter to  
1 o'clock

[Without pencil.]

1. How far around the clock face does the minute hand travel while the hour hand is passing from XII to I?
2. Where is the minute or long hand when one hour is over and another is about to begin?

3. Where is the minute hand when the hour is half over? When it is a quarter over?
4. Where is the minute hand at a quarter before the hour?
5. What part of an hour has passed when the minute hand is at III? When it is at VI? When it is at IX?
6. Tell the time by these clocks:



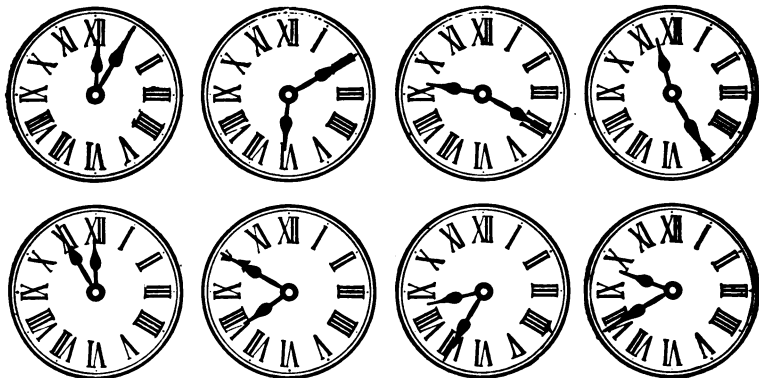
### 100. The Hour and the Minute

[Without pencil.]

1. How many minutes are marked off by the minute hand in passing from XII to I? From I to II? From II to III?
2. Count the minutes around the clock face by fives. By tens.
3. How many minutes in an hour? In a half-hour? In a quarter of an hour?
4. How many minutes past the hour is it when the minute hand is at II? When it is at IV? When it is at V?



5. How many minutes before the hour is it when the minute hand is at XI? When it is at X? When it is at VII? When it is at VIII?



6. Tell the time by the clocks above.

Set the hands of a clock:

7. At 10 minutes past 12 o'clock.
8. At 25 minutes past 11 o'clock.
9. At 5 minutes before 2 o'clock.
10. At 15 minutes before 4 o'clock.
11. At 25 minutes before 7 o'clock.
12. Set the minute hand of a clock at 7 minutes past the hour. At 12 minutes past. At 23 minutes past. At 30 minutes past.

How many minutes in the same hour:

13. Between 10 and 20 minutes past?
14. Between 3 and 12 minutes past?

15. Between 8 and 15 minutes past?
16. Between 5 and 25 minutes past?
17. Between 15 and 30 minutes past?
18. Between 15 and 22 minutes past?
19. Between 7 and 24 minutes past?

20. Set the hands of the clock at 7 minutes before the hour. At 12 minutes before. At 22 minutes before. At 27 minutes before.

How many minutes in the same hour:

21. Between 15 minutes before the hour and 10 minutes before?
22. Between 20 minutes before and 5 minutes before?
23. Between 25 minutes before and 10 minutes before?

### 101. Time at Play

[Without pencil.]

1. John went to play with Walter for a half-hour. He reached Walter's house at 15 minutes past 4 o'clock. When was it time for him to leave?

2. Nellie reached Carrie's house at 5 minutes past 10, for a visit of 20 minutes. When was it time for her to go?

3. Frank was to play with Robert an hour and a quarter. When was his time up, if he reached Robert's house at 4 o'clock?

4. Kate played with her dolls from 5 minutes past 3 o'clock until 25 minutes past 3. She played — minutes.

5. Fred played ball from 10 minutes past 4 o'clock until half past 4 o'clock. Find how long he played.

## 102. The Calendar for a Year

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.		Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Jan.	3	4	5	6	7	8	9	July.	4	5	6	7	8	9	10
	10	11	12	13	14	15	16		11	12	13	14	15	16	17
	17	18	19	20	21	22	23		18	19	20	21	22	23	24
	24	25	26	27	28	29	30		25	26	27	28	29	30	31
	31							Aug.	1	2	3	4	5	6	7
Feb.	1	2	3	4	5	6			8	9	10	11	12	13	14
	7	8	9	10	11	12	13		15	16	17	18	19	20	21
	14	15	16	17	18	19	20		22	23	24	25	26	27	28
	21	22	23	24	25	26	27	Sept.	29	30	31				
	28											1	2	3	4
Mar.	1	2	3	4	5	6			5	6	7	8	9	10	11
	7	8	9	10	11	12	13		12	13	14	15	16	17	18
	14	15	16	17	18	19	20		19	20	21	22	23	24	25
	21	22	23	24	25	26	27	Oct.	26	27	28	29	30		
	28	29	30	31					3	4	5	6	7	8	9
April.	4	5	6	7	8	9	10		10	11	12	13	14	15	16
	11	12	13	14	15	16	17		17	18	19	20	21	22	23
	18	19	20	21	22	23	24		24	25	26	27	28	29	30
	25	26	27	28	29	30		Nov.	31						
									1	2	3	4	5	6	
May.	2	3	4	5	6	7	8		7	8	9	10	11	12	13
	9	10	11	12	13	14	15		14	15	16	17	18	19	20
	16	17	18	19	20	21	22		21	22	23	24	25	26	27
	23	24	25	26	27	28	29	Dec.	28	29	30				
	30	31										1	2	3	4
June.			1	2	3	4	5		5	6	7	8	9	10	11
	6	7	8	9	10	11	12		12	13	14	15	16	17	18
	13	14	15	16	17	18	19		19	20	21	22	23	24	25
	20	21	22	23	24	25	26		26	27	28	29	30	31	
	27	28	29	30											

[Without pencil.]

1. How many months are there in the year?

2. Which is the first month? Which the second?

3. Name the months by their order names, beginning: "January is the first month."

4. Which months have 30 days? Learn them by heart.

5. What month has 28 days except in leap year, when it has 29?

6. How many days are there in July after the Fourth?

7. How many days are there in June after Flag Day (the 14th)?

8. Find the number of days in August after the 15th. In November after the 19th.

9. How many days are there in December after Christmas? How many days:

10. From the 12th of February to the 22d?

11. From the 5th of March to the 18th?
12. From the 7th of April to the 30th?
13. From the 4th of July to the 25th?
14. From the 3d of October to the 21st?
15. From April 28th to May 5th?
16. From June 28th to July 4th?
17. From August 25th to September 10th?
18. From September 27th to October 18th?
19. From November 24th to December 24th?

[With pencil.]

20. Find the number of days in a common year by adding the number of days in all the months. (See page 124.)

21. How many days in a leap year?

22. Find the number of weeks in a common year by dividing the number of days in a year by 7.

23. Learn this table:

60 seconds make 1 minute.

60 minutes make one hour.

24 hours make 1 day.

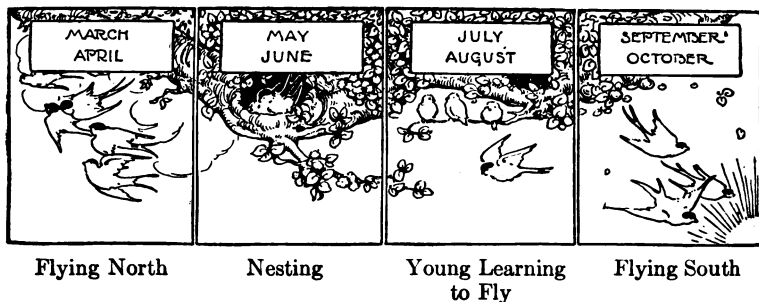
7 days make 1 week.

365 days make 1 common year.

366 days make 1 leap year.

24. A month containing 30 or 31 days (28 or 29 in February) is called a calendar month; one containing 4 weeks is called a lunar month. Find, with your teacher's help, the reasons for these names.

25. Divide 52 weeks by 4 weeks, to find how many lunar months there are in a year.

103. A Bird Calendar <sup>1</sup>

[Use pencil only when needed.]

1. A pair of bobolinks began to build their nest on May 15th, and finished it May 29th. How many days did it take?
2. Baby robins hatched out May 13th were ready to leave the nest in 11 days. On what date were they ready to leave?
3. Baby blue jays, hatched out June 14th, left their nest June 30th. How much older were they when they left their nest than the robins were when they left theirs?

Some birds spend many weeks north; other birds only a few weeks. Find how many weeks these birds were north:

4. A pair of robins came north the middle of March and stayed 239 days.
5. A pair of bobolinks came north the middle of May and stayed 108 days.
6. A pair of whip-poor-wills came the last of April and stayed 123 days.
7. A pair of meadowlarks came the first of April and stayed 212 days.

<sup>1</sup> These facts were furnished by Mr. John Burroughs and other naturalists.

## CHAPTER VI. REVIEW

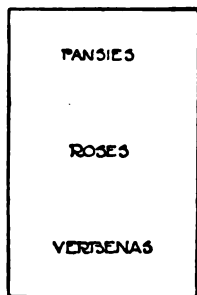
### 104. Drawing Garden Plans

[Use pencil only when needed.]

1. This is a plan of Helen's garden. Each inch in the plan stands for 10 feet. How wide is Helen's garden? How long is it?

2. Helen planted rose bushes in a row 8 feet long. Draw a line to stand for the row, using a 1-inch line to stand for each foot in the row. How long is your line?

3. Helen planted a row 6 feet long with pansies. Draw a line to stand for the row of pansies, using a 1-inch line to stand for each 2 feet in the row. How long is this line?



Let one inch stand for each foot. Tell how to draw:

4. The plan of a flower bed 4 feet wide and 6 feet long.
5. The plan of a flower bed 2 feet wide and 8 feet long.
6. The plan of a flower bed 3 feet wide and 7 feet long.

Let one inch stand for each 10 feet and draw:

7. A plan of a garden 20 feet wide and 30 feet long.
8. A plan of a garden 30 feet wide and 50 feet long.
9. Write the measurements on the garden plans, then make problems about the gardens.

## 105. Raising Vegetables

[Use pencil only when needed.]

1. Robert has a garden 50 feet wide and 60 feet long. Make a drawing of his garden, using a 1-inch line to stand for each 10 feet.

2. Write the measurements of the garden on the plan, then find the distance around Robert's garden.

3. Robert planted tomatoes, cabbages, carrots, peas, beets, and radishes in his garden. Find from the following record the number of weeks that passed before each vegetable was ready for gathering:

The radishes took 42 days.

The beets took 65 days.

The cabbages took 60 days.

The carrots took 70 days.

The peas took 63 days.

The tomatoes took 150 days.

4. Robert planted 4 rows of tomato plants, 18 in a row. How many tomato plants did he have?

5. He planted 3 rows of cabbages, 22 in a row. Find the number of cabbages there were in Robert's garden.

6. Robert sold his tomatoes for \$1.25 a bushel. How much did he receive for 6 bushels?

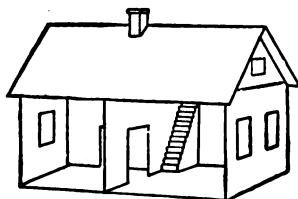
7. He sold his peas for \$1.50 a bushel. How much did he receive for  $\frac{1}{2}$  bushel? For 4 bushels?

8. He sold the cabbages to a grocer at 5¢ apiece. How many was it necessary for him to sell in order to receive 75¢? To receive \$1.50?

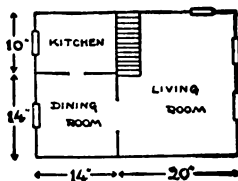
9. Robert's mother paid him 25¢ a week for 9 weeks for vegetables. How much did she pay him in all?

## 106. Building a Playhouse

" is the sign for inches.



The Playhouse



Plan of First Floor

Tom and Henry made a playhouse out of a drygoods box, and Helen and Mary furnished the house with paper furniture.

First the boys cut holes in the box for windows and built in the partitions. Next, they put a roof on the house and made two rooms in the attic. Last of all, they painted the house.

[Use pencil only when needed.]

1. Find from the plan of the first floor the length and width of the kitchen. Of the dining room.

2. The partition between the kitchen and the dining room was 1 inch thick. What then was the length of the living room?

3. The length of the living room was how much greater than its width?

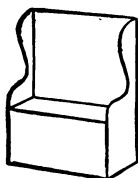
4. The boys had \$1.00 to spend on the house. They paid 25¢ for a small can of paint, 10¢ for a paint brush, and 5¢ for nails. How much was left?



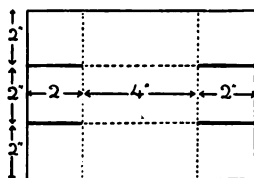
5. Then, with half of the money left, they bought narrow strips of wood to put around the windows and doors. How much did the boys spend for the wood?

### 107. Making Playhouse Furniture

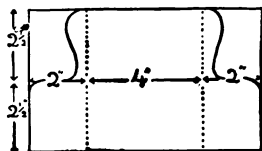
To make the furniture pictured below, draw the patterns on heavy paper, cut on the heavy lines, fold on the dotted lines, then paste the parts together.



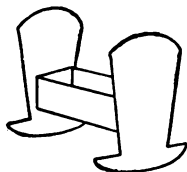
Grandfather's  
Settle



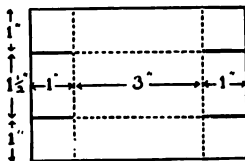
Pattern for  
Seat



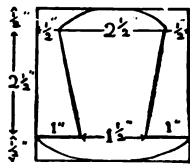
Pattern for  
Back and Sides



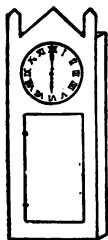
Grandfather's  
Cradle



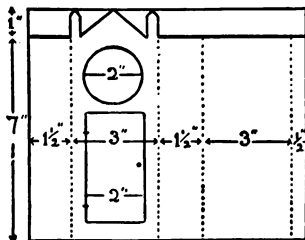
Pattern for Box to  
Cradle



Pattern for  
Rocker and Ends



Grandfather's  
Clock



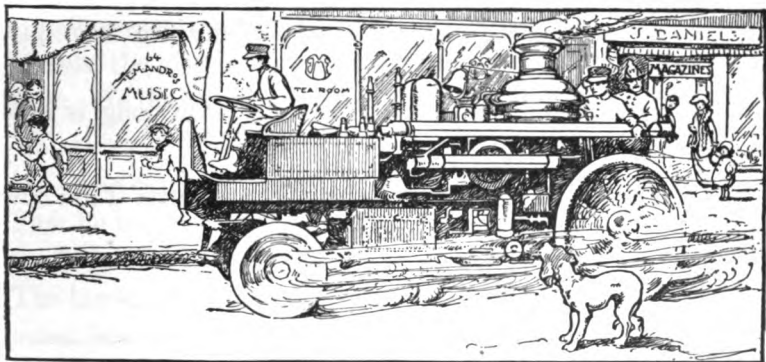
Pattern for  
Grandfather's Clock



Clock  
Face

Find how long and how wide a piece of paper is required for each pattern, then choose one piece of furniture and make it.<sup>1</sup>

### 108. The Firemen



[With pencil.]

1. A city has in its fire companies, 11 captains, 12 drivers, 40 hosemen, 10 laddermen, and 24 other men. How many firemen are there?

2. The fire chief is paid \$3500 a year, each captain is paid \$1500. How much more does the chief get than one of the captains?

3. Three new horses are to be bought at \$318 apiece. How much must be paid for them?

<sup>1</sup> The clock face is made of a circle of white paper and is pasted on the finished clock. To have it symmetrical, see that pupils first divide the circumference into fourths, and then the fourths into thirds. At the divisions, the Roman numerals are written.

The table for this set is made by pasting a rectangle of paper 4 inches by 6 inches on an inverted box made 5 inches long, 3 inches wide, and  $2\frac{1}{2}$  inches deep. The box requires a rectangle of paper 8 inches by 10 inches. The bed is made by pasting end boards  $3\frac{1}{2}$  inches square on an inverted box made 5 inches long,  $3\frac{1}{2}$  inches wide, and  $1\frac{1}{2}$  inches deep. The chair is made by adapting the pattern of the settle.

4. Two fire-autos are to be bought. One is to cost \$9,500, and the other \$8,500. Find the cost of the two.
5. In one spring the firemen put out 24 fires; in the summer of the same year, they put out 38 fires; in the fall, 52 fires; and in the winter, 40 fires. Find how many fires were put out.
6. Hose comes in lengths of 50 feet. How long is hose made of 6 pieces?
7. An engine can pump 900 gallons in a minute. Find how many gallons it can pump in 7 minutes.

### 109. A Rural Mail Route



[Use pencil only when needed.]

1. This postman carries mail to people living in the country. For 6 days each week he is on his route from 8 o'clock in the morning until 12 o'clock at noon, and from 1 o'clock in the afternoon until 4 o'clock. How many hours is he on his route each day?

How many hours a week?

2. The postman's route is 23 miles long. How far does he travel each week?
3. In the morning the postman leaves mail at 38 places; in the afternoon, at 24. At how many places does he stop to leave mail?

4. He weighs his mail bag each day. On some days the bag is heavier than on others; but he finds that, if the weights were evened up, the bag would weigh 26 pounds a day. How many pounds does this make for each week (6 days)?

5. The postman carries parcels. Once he delivered 124 parcels the day before Christmas and 150 on Christmas Day. He delivered how many more parcels on Christmas Day than on the day before?

6. The postman bought his own horses, cart, and harness. First he bought 2 horses at \$225 each; then he bought a cart for \$95, and a harness for \$62. The horses cost how much? The horses, cart, and harness together cost how much?

## 110. General Review

Add:

I

[Without pencil.]

1.	3	2	4	3	2.	4	5	4	3	4
	2	3	5	3		3	4	6	5	4
	3	4	5	4		6	5	7	8	8
	4	5	6	9		7	8	8	6	9
	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>

Subtract:

3.	22	38	84	4.	35	46	56	83
	<u>4</u>	<u>5</u>	<u>6</u>		<u>7</u>	<u>9</u>	<u>8</u>	<u>8</u>

Complete:

5.	$7 \times 4 = ?$	$8 \times 7 = ?$	6.	$32 \div 4 = ?$	$63 \div 7 = ?$
	$8 \times 4 = ?$	$9 \times 7 = ?$		$48 \div 6 = ?$	$56 \div 8 = ?$
	$9 \times 5 = ?$	$9 \times 8 = ?$		$72 \div 6 = ?$	$96 \div 8 = ?$
	$4 \times 6 = ?$	$12 \times 9 = ?$		$54 \div 6 = ?$	$81 \div 9 = ?$

Add:

[With pencil.]

$$\begin{array}{r} 7. \quad 234 \\ 123 \\ 344 \\ \underline{45} \end{array}$$

$$\begin{array}{r} 8. \quad 324 \\ 145 \\ 546 \\ \underline{327} \end{array}$$

$$\begin{array}{r} 9. \quad 145 \\ 356 \\ 243 \\ \underline{189} \end{array}$$

$$\begin{array}{r} 10. \quad 204 \\ 320 \\ 1428 \\ \underline{3627} \end{array}$$

$$\begin{array}{r} 11. \quad 1234 \\ 3740 \\ 2988 \\ \underline{3479} \end{array}$$

Subtract:

$$\begin{array}{r} 12. \quad 694 \\ 177 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 13. \quad 824 \\ 183 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 14. \quad 822 \\ 178 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 15. \quad 900 \\ 729 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 16. \quad 3422 \\ 1586 \\ \underline{\phantom{00}} \end{array}$$

Multiply:

$$\begin{array}{r} 17. \quad 320 \\ 4 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 18. \quad 414 \\ 5 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 19. \quad 273 \\ 3 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 20. \quad 694 \\ 6 \\ \underline{\phantom{00}} \end{array}$$

$$\begin{array}{r} 21. \quad 4296 \\ 2 \\ \underline{\phantom{00}} \end{array}$$

Divide:

$$22. \quad 4 \overline{)884}$$

$$23. \quad 3 \overline{)372}$$

$$24. \quad 5 \overline{)165}$$

$$25. \quad 4 \overline{)934}$$

$$26. \quad 6 \overline{)618}$$

Find the answers:

$$27. \quad \$2.75 + \$10.00 + \$4.82 = ?$$

$$31. \quad \frac{1}{4} \text{ of } \$8.52 = ?$$

$$28. \quad \$3.75 - \$1.48 = ?$$

$$32. \quad \$5.00 - \$2.89 = ?$$

$$29. \quad \$2.84 \times 3 = ?$$

$$33. \quad \$8.76 \times 5 = ?$$

$$30. \quad \$4.82 + \$15.34 + 79\text{¢} = ?$$

$$34. \quad \frac{1}{2} \text{ of } \$9.72 = ?$$

## II .

[Without pencil.]

1. A triangle is 8 inches on a side. What is the distance around it?

2. A line is 4 yards long. Find its length in feet.

3. What is the length in inches of a line 1 foot 6 inches long?

4. A square measures 6 feet on a side. What is the distance around it in yards?

5. A wire is 6 yards and 2 feet long. How many feet long is it?

6. How many plants can be set in a row 27 feet long if each is given 3 feet of space?

7. A can holds 5 gallons of milk. How many quarts does it hold?

8. At 8¢ a pint, what is the cost of a quart of milk?

9. At 10¢ a quart, how much must be paid for 1 pint of vinegar? For 3 pints?

10. A street car takes a quarter of an hour to make a trip. How many minutes does it take?

11. Fred takes from 8 minutes past 4 o'clock to 25 minutes past to do an errand. How long does it take him?

12. How many minutes are there from 25 minutes past 5 o'clock until 20 minutes before 6 o'clock the same afternoon?

13. How many hours are there from 11 o'clock in the morning until 8 o'clock at night?

14. How many days are there from June 4th to June 27th? From June 28th to July 4th?

15. How many weeks are there in 42 days?

16. What is the value of 3 dimes, 2 nickels, and 8 cents?

17. What is the value of 1 quarter, 2 dimes, 2 nickels, and 2 cents?

18. Name the coins that might be given Mary as change when she buys a doll for 10¢, and gives the clerk a quarter.

19. Name coins that equal 50 cents.

20. Name coins that equal one dollar.

21. What is the cost of a story book at 20¢, a pencil at 5¢, and a box of paints at 9¢?

22. What is the cost of 6 sheets of cardboard at 8¢ a sheet?

23. At 9¢ each, how many paper dolls can be bought for 45¢?

24. At 10¢ a box, how many boxes of crackers can be bought for 50¢?

25. What is the change from 50¢ when 4 toys at 10¢ each are bought?

26. What is the change from 50¢ when 1 toy is bought for 20¢ and another toy is bought for 10¢?

27. At the rate of 5¢ a day, how long does it take John to save 60¢?

28. How much have I left if I earn 50¢ and spend 10¢ for ice-cream and 20¢ for candy?

29. How much have I left if I earn 40¢ one day and 20¢ the next day and then spend 30¢ of my earnings?

30. Frank had one dollar. He bought 3 neckties at 25¢ apiece. How much did he have left?

[With pencil.]

31. What is the distance around a square playground 212 feet on a side?

32. It takes 4 days to cross the United States. How many hours does it take?

33. The children from three schools joined for a picnic. How many children were at the picnic if there were 240 children from one school, 124 from another, and 129 from the third school?

34. At the rate of 5¢ a day, how long does it take a boy to save money enough to buy a football that costs \$2.25?

35. How much change from \$5.00 should be given Helen when she buys a set of dishes that costs \$1.48?

36. Fred had \$4.50. He spent  $\frac{1}{2}$  of it for a pair of skates. How much did the skates cost?

37. Margaret had \$12.00. She spent \$4.50 for new shoes and \$5.25 for a new hat. How much did she have left?

### III. Progress Score

These are tests or "examinations" by which you may measure your year's work in arithmetic. Try to make 100 points on each test.<sup>1</sup>

I. Add. Count 10 for each correct answer.

[With pencil.]

1. 24	2. 60	3. 45	4. 4	5. 32
35	23	58	5	25
<u>      </u>	<u>      </u>	<u>      </u>	0	54
			4	44
6. 24	7. 544	8. \$5.45	5	26
35	325	3.65	8	18
49	248	7.16	5	<u>      </u>
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	

<sup>1</sup> See footnote, page 78.



Write in columns and find answers:

9.  $540 + 324 + 546 + 355 + 548 = ?$

10.  $\$4.43 + \$2.51 + 42¢ + \$3.00 + \$2.78 = ?$

II. Subtract. Count 10 for each correct answer.

1.  $\begin{array}{r} 58 \\ 25 \\ \hline \end{array}$

2.  $\begin{array}{r} 93 \\ 50 \\ \hline \end{array}$

3.  $\begin{array}{r} 42 \\ 5 \\ \hline \end{array}$

4.  $\begin{array}{r} 54 \\ 29 \\ \hline \end{array}$

5.  $\begin{array}{r} 827 \\ 165 \\ \hline \end{array}$

6.  $\begin{array}{r} 432 \\ 197 \\ \hline \end{array}$

7.  $\begin{array}{r} 80 \\ 24 \\ \hline \end{array}$

8.  $\begin{array}{r} 400 \\ 128 \\ \hline \end{array}$

9.  $\begin{array}{r} \$6.74 \\ 2.18 \\ \hline \end{array}$

10.  $\begin{array}{r} \$10.00 \\ 2.74 \\ \hline \end{array}$

III. Multiply. Count 10 for each correct answer.

1.  $\begin{array}{r} 23 \\ 2 \\ \hline \end{array}$

2.  $\begin{array}{r} 50 \\ 4 \\ \hline \end{array}$

3.  $\begin{array}{r} 27 \\ 2 \\ \hline \end{array}$

4.  $\begin{array}{r} 481 \\ 3 \\ \hline \end{array}$

5.  $\begin{array}{r} 204 \\ 6 \\ \hline \end{array}$

6.  $\begin{array}{r} 164 \\ 7 \\ \hline \end{array}$

7.  $\begin{array}{r} 352 \\ 8 \\ \hline \end{array}$

8.  $\begin{array}{r} 640 \\ 3 \\ \hline \end{array}$

9.  $\begin{array}{r} \$2.25 \\ 5 \\ \hline \end{array}$

10.  $\begin{array}{r} \$4.60 \\ 9 \\ \hline \end{array}$

IV. Divide. Count 10 for each correct answer.

1.  $2 \overline{)84}$

2.  $3 \overline{)960}$

3.  $4 \overline{)92}$

4.  $5 \overline{)160}$

5.  $3 \overline{)612}$

6.  $6 \overline{)187}$

7.  $4 \overline{)1456}$

8.  $5 \overline{)\$7.85}$

9.  $\frac{1}{2}$  of  $\$7.50 = ?$

10.  $\frac{1}{8}$  of  $176 = ?$

## PART TWO

### CHAPTER I. WORK AND PLAY AT SCHOOL

#### 1. Schoolroom Measurements



#### I. MAKING ESTIMATES

1. Without the help of a ruler, draw a line a foot long. Measure and, if necessary, correct your drawing.
2. Practice drawing lines two and three feet long.
3. Try to tell, without measuring, the length and width in feet of each of your blackboards. Measure them.
4. In the same way, make estimates in feet, and then take measurements, of other objects about you.
5. With the help of a foot rule, draw lines a given number

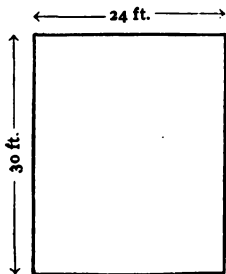
of inches long. Let your classmates first guess the lengths of the different lines, then measure them.

6. Estimate in inches the length and width of the different books in your desk. Test your estimates.

## II. FINDING THE PERIMETER

[Use pencil only when needed.]

1. This is a plan of a rectangular schoolroom. How long is the room? How wide is it?



**Perimeter = distance around.**

2. What is the distance around the schoolroom? What is its perimeter?

3. Find in feet the length and width of your schoolroom. Draw a plan of the room; label the plan with the measurements; then find the perimeter of the room.

4. Find the length and width in inches of the top of your school desk. Draw a plan of it, then find its perimeter.

5. Draw plans and find the perimeters of other surfaces in your schoolroom.<sup>1</sup>

Find the perimeter:

6. Of a rectangular schoolroom 25 feet wide and 27 feet long.

7. Of a doorway 3 feet wide and 6 feet high.

8. Of a window 36 inches wide and 72 inches high.

<sup>1</sup> These drawings are to show roughly the proportion of the length and the width of each surface, but are not to be drawn to a scale.

9. Of a blackboard 4 feet wide and 12 feet long.
10. Of the top of a desk 16 inches wide and 18 inches long.
- \*11. What is the difference between the perimeter of a school-room 24 feet wide and 30 feet long and the perimeter of a hall 12 feet wide and 60 feet long?<sup>1</sup>

## 2. Measuring Long Distances

Long distances out of doors are measured in miles.

[Use pencil only when needed.]

1. If it takes you 10 minutes to reach school when you walk at the rate of 20 minutes to a mile, what part of a mile is your home from the school? If it takes you 5 minutes, what part of a mile is the distance?

2. Name a street or a building that is a mile from your school.

$$1 \text{ mile} = 5280 \text{ feet.}$$

3. How many feet of telephone wire are needed to extend from your school to a place  $\frac{1}{2}$  mile away?

4. Find how many feet there are in  $\frac{1}{4}$  of a mile.

5. When streets are marked off so that there are 8 blocks to a mile, how many feet long is each block?

6. Find the length of each block when there are 10 blocks to a mile.

\*7. A rectangular park is  $\frac{1}{2}$  mile long and  $\frac{1}{4}$  mile wide. Make a drawing of the park, write in the measurements in feet, and then find the perimeter of the park in feet.

<sup>1</sup> All problems starred throughout this text are intended as optional work for those pupils only who have the necessary time and ability for them.

## 3. School Supplies

(1) A fourth-grade class used 58 packages of paper in the fall term of one year, 75 packages in the winter term, and 36 in the spring term. How can the total number of packages be found? How many packages were used?

(2) The pens and pencils used by the class in a year cost \$2.75; the writing paper, \$25.74; the drawing paper, \$8.38; other supplies, \$7.64. How much did all the supplies cost?

(1)

To find the total number of packages used, the numbers 58, 75, and 36 are added.

$$58 + 75 + 36 = ?$$

$$\begin{array}{r} 58 \\ 75 \\ 36 \\ \hline 169 \text{ Sum} \end{array}$$

The total number of packages used = 169.

(2)

To find the cost of the supplies, the sum of \$2.75, \$25.74, \$8.38, and \$7.64 is found.

$$\$2.75 + \$25.74 + \$8.38 + \$7.64 = ?$$

$$\begin{array}{r} \$2.75 \\ 25.74 \\ 8.38 \\ 7.64 \\ \hline \$44.51 \end{array}$$

The cost of supplies = \$44.51.

An answer found by adding numbers is called a **sum**.

1. In the second solution above, which number is the sum?
2. In this solution, before which two numbers is the dollar sign written? How many places in the answer are pointed off for cents?

[With pencil.]

3. Play that you are a teacher and that when you count the books in your schoolroom you find 128 readers, 48 music books, and 54 geographies. How many books are there?

4. Your children use 105 sheets of paper on Monday, 96 sheets on Tuesday, 125 sheets on Wednesday, 144 sheets on Thursday, and 98 sheets on Friday. How many sheets of paper are used during the week?

5. The paper used by your pupils costs \$1.24 the first week of school; \$1.38, the second week; \$.98, the third week; and \$1.54, the fourth week. What is the cost for the month?

#### 4. Practice in Addition

[With pencil.]

To make sure that a sum is right, men and women in business test all work. See that during this coming year, you, too, form this useful habit of testing answers.<sup>1</sup>

To avoid mistakes, *copy figures neatly in straight columns.*<sup>2</sup>

Add each column from the bottom up. Test by adding down:

1. 342	2. 2455	3. 3424	4. 4553	5. 4204
452	543	245	3425	5420
304	3424	1423	5454	3255
545	4024	5504	3424	4244
<u>354</u>	<u>3433</u>	<u>4055</u>	<u>454</u>	<u>3554</u>

Add by columns and then across by rows. Test each answer:

6. \$2.40	7. \$14.24	8. \$45.32	9. \$215.40	10. \$315.20
1.24	3.45	24.14	13.22	25.40
3.42	25.50	33.05	114.45	214.30
<u>4.55</u>	<u>4.35</u>	<u>3.24</u>	<u>44.43</u>	<u>42.54</u>

<sup>1</sup> Pupils should be helped in forming this useful habit, not only that they may early conform to a universal practice in business, but that each pupil may become more efficient in his school work.

<sup>2</sup> The last exercise requires copying. To save copying the first problems, and such exercises through the book as those on page 144, pupils may turn back a

## 5. Timing Work in Addition

Try, within the time limit, to write the correct sums for the problems in the test. If you fail to get all the problems done, or get an answer wrong, use Exercise II for practice, then try the test again.<sup>1</sup>

[Write answers on the folds of a paper.]

## I. TEST. Add and test. Time limit, 5 minutes.

552	455	534	434	545
443	544	451	205	455
255	345	345	355	344
304	543	543	434	453
<u>244</u>	<u>454</u>	<u>403</u>	<u>534</u>	<u>535</u>

## II. PRACTICE. Add:

1. 243	2. 325	3. 413	4. 225	5. 124
352	543	255	422	454
425	405	434	355	505
104	324	233	204	550
<u>234</u>	<u>522</u>	<u>454</u>	<u>355</u>	<u>443</u>
6. 523	7. 345	8. 342	9. 405	10. 254
424	450	423	534	304
325	204	555	445	345
455	253	235	224	553
<u>303</u>	<u>324</u>	<u>544</u>	<u>534</u>	<u>344</u>

sheet of paper forming, for each row of answers, a fold about an inch wide. These folds may be placed below the problems in the book.

<sup>1</sup> All work in addition should be automatic. If any members of a class have the habit of counting while adding, the work should be simplified for them until they are prepared to add automatically. At first in column addition use no number greater than 4 or 5 (see exercise above). While the children are working with such combinations, prepare them for column addition in which the figure 6 occurs. To do this, give continued practice in adding in which the number 6 is used (see page 148).

## 6. At the Football Game

(1) There are 220 boys at a football game. 98 leave to catch an early train. How can the number of boys that are left on the grounds be found? What is the number?

(2) The gate receipts at one game are \$18.75; at another, \$14.25. How much more is received at one game than at the other?

(1)

To find the number of boys left on the grounds, 98 is subtracted from 220.

$$220 - 98 = ?$$

220	Minuend
98	Subtrahend
122	Difference or Remainder

The number of boys left on the grounds = 122.

(2)

To find how much more money is received at one game than at the other, \$14.25 is subtracted from \$18.75.

$$\$18.75 - \$14.25 = ?$$

\$18.75
14.25
\$4.50

The difference in the gate receipts = \$4.50.

In subtraction, the number from which another is taken is called the **minuend**; the number taken from the minuend is called the **subtrahend**; the answer found is called the **difference** or **remainder**.

1. In the second problem above, which number is the minuend? Which the subtrahend? Which the difference or remainder?

2. In subtracting sums of money containing dollars and cents, before which two terms is the dollar sign written? How many places are pointed off in the remainder for cents?



Subtract, then name terms:

[With pencil.]

$$\begin{array}{r} 3. \ 384 \text{ boys} \\ 112 \text{ " } \\ \hline \end{array}$$

$$\begin{array}{r} 4. \ 242 \text{ girls} \\ 128 \text{ " } \\ \hline \end{array}$$

$$\begin{array}{r} 5. \ \$4.28 \\ 2.84 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \ \$16.08 \\ 12.32 \\ \hline \end{array}$$

7. Play that you are a ticket seller at a football game, and that out of 342 tickets printed you sell 226. How many tickets would you have left?

8. At a game between two schools there are present 219 boys and girls from one school and 184 from the other. How many more are there from one school than from the other?

9. At one game the gate receipts are \$15.25. The expenses are \$9.75. How much money is cleared?

### 7. A Test for Subtraction

1. Subtract 7 from 12. What is the difference?

2. Add the difference (5) to the subtrahend (7). The sum equals what other term?

$$424 - 218 = ?$$

$\begin{array}{r} 424 \\ 218 \\ \hline 206 \end{array}$	Minuend Subtrahend Difference	$206 \text{ (difference)} + 218 \text{ (subtrahend)} = 424$ (minuend). The difference + the subtrahend = the minuend.
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To test an answer in subtraction, add the difference to the subtrahend. The sum should equal the minuend.<sup>1</sup>

Subtract and test:

[With pencil.]

$$\begin{array}{r} 3. \ 984 \\ 642 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \ 722 \\ 308 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \ 4829 \\ 1344 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \ 2422 \\ 1016 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \ 4289 \\ 1345 \\ \hline \end{array}$$

<sup>1</sup> Pupils should be required to test each subtraction by adding the difference to the subtrahend *without rewriting these numbers*.

## 8. Timing Work in Subtraction

Try, within the time limit, to write the correct answers for the problems in the test. If you fail to get all of the problems done, or get an answer wrong, use Exercise II for practice, then try the test again.

[Write answers on the folds of a paper.]

I. TEST. Subtract. Time limit,  $1\frac{1}{2}$  minutes.

A. 796 <u>240</u>	B. 1172 <u>435</u>	C. 1425 <u>542</u>	D. 1334 <u>345</u>	E. 1200 <u>524</u>
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II. PRACTICE. Subtract:

A. 1. 874 <u>350</u>	2. 967 <u>430</u>	3. 786 <u>301</u>	4. 973 <u>250</u>	5. 859 <u>405</u>
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B. 6. 1261 <u>422</u>	7. 1174 <u>535</u>	8. 1052 <u>443</u>	9. 1493 <u>545</u>	10. 1380 <u>453</u>
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C. 11. 1104 <u>421</u>	12. 1327 <u>542</u>	13. 1408 <u>543</u>	14. 1209 <u>425</u>	15. 1047 <u>251</u>
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D. 16. 941 <u>254</u>	17. 834 <u>345</u>	18. 1224 <u>545</u>	19. 1032 <u>143</u>	20. 1113 <u>424</u>
--------------------------	-----------------------	------------------------	------------------------	------------------------

21. 1043 <u>455</u>	22. 1124 <u>535</u>	23. 1432 <u>443</u>	24. 1220 <u>354</u>	25. 1321 <u>452</u>
------------------------	------------------------	------------------------	------------------------	------------------------

E. 26. 700 <u>224</u>	27. 900 <u>543</u>	28. 1000 <u>252</u>	29. 1400 <u>534</u>	30. 1300 <u>431</u>
--------------------------	-----------------------	------------------------	------------------------	------------------------

31. 800 <u>521</u>	32. 700 <u>433</u>	33. 1100 <u>342</u>	34. 1200 <u>523</u>	35. 200 <u>4</u>
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9. Review and Practice with the Number 6<sup>1</sup>

[Write answers on the folds of a paper.]

Practice adding these numbers, then subtracting them:

1.	11	17	12	14	18	13	16	19	15
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>

Practice until you can add these columns at a steady rate.

In adding 3, 6, 4, say 9, 13, or merely 13.

2.	4	3	6	6	3	4.	4	6	6	5	6
	6	6	2	5	6		2	5	2	6	2
	3	5	5	4	5		0	6	6	6	6
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		6	2	3	4	0
	3	6	6	5	6		2	6	6	5	6
3.	6	0	3	5	3		6	3	4	5	4
	5	6	6	6	6		3	4	4	5	5
	6	5	5	4	3		<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
	5	2	4	2	5						
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>						

[With pencil]

Add by columns and then across by rows. Test each answer

	5.	6.	7.	8.	9
10.	566	656	2666	5646	34
11.	456	464	456	566	5645
12.	665	666	5646	6656	366
13.	464	655	4662	4563	4564
14.	<u>346</u>	<u>546</u>	<u>3566</u>	<u>5466</u>	<u>5654</u>

Add and test:

15. \$2.65, \$14.26, \$4.50, \$6.60, \$25.56, \$66.55.

16. \$13.46, \$106.06, \$16.62, \$124.62, \$326.45.

17. \$166.25, \$6.62, \$16.46, \$126.60, \$620.14, \$465.60.

<sup>1</sup> P.  
ence to<sup>1</sup> See footnote, page 144.

Subtract and test:

$$\begin{array}{r} 18. \ 846 \\ \underline{324} \end{array}$$

$$\begin{array}{r} 19. \ 873 \\ \underline{246} \end{array}$$

$$\begin{array}{r} 20. \ 829 \\ \underline{166} \end{array}$$

$$\begin{array}{r} 21. \ 1804 \\ \underline{606} \end{array}$$

$$\begin{array}{r} 22. \ 4205 \\ \underline{1666} \end{array}$$

$$\begin{array}{r} 23. \ \$2.85 \\ \underline{1.66} \end{array}$$

$$\begin{array}{r} 24. \ \$3.56 \\ \underline{1.64} \end{array}$$

$$\begin{array}{r} 25. \ \$18.00 \\ \underline{6.46} \end{array}$$

$$\begin{array}{r} 26. \ \$30.42 \\ \underline{16.64} \end{array}$$

$$\begin{array}{r} 27. \ \$50.00 \\ \underline{16.26} \end{array}$$

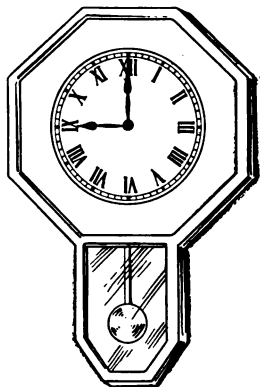
### 10. The Schoolroom Clock

1. A recess lasts from 15 minutes past ten o'clock until 25 minutes past. How long is the recess?

Fifteen minutes past ten o'clock is often written 10:15 and read ten fifteen.

Fifteen minutes before eleven o'clock is often thought of as 45 minutes past ten o'clock and written 10:45.

2. What advantage is there in writing fifteen minutes past ten as 10:15, and fifteen minutes before eleven as 10:45?



Write in figures, using the short form shown above:

3. Ten minutes past eight o'clock.
4. Fourteen minutes past eleven o'clock.
5. Twenty minutes past one o'clock.
6. Twenty minutes before two o'clock.
7. Ten minutes before five o'clock.

8. How many minutes are there in the morning between 9:05 and 9:12? How many are there between 10:55 and 11:08?

9. How many minutes are there in the afternoon between 1:30 and 1:45? Between 2:53 and 3:05?

10. Mary left home at 8:30 in the morning and reached school at 8:50. How many minutes was she on her way?

11. When Tom compared his watch with the correct time, he found that his watch said 9:55 and that the correct time was 10:10. How slow was Tom's watch?

12. A gymnastic lesson lasted from 10:24 until 10:35. How long was the lesson?

13. Margaret studies her reading lesson from 2:45 until 3:05. How many minutes does she study?

14. Henry takes from 11:09 until 11:34 to work on his arithmetic problems. Find how many minutes he uses.

15. Make and solve a problem about the time taken to learn a spelling lesson.

16. Make and solve other problems about the use of time in school.

### 11. Playground Problems

[Without pencil.]

1. A recess lasts from 10:25 until 10:40. How many minutes long is it?

2. Henry reaches school at 8:42. How much time has he for play before school is called at 8:55?

3. In a game of hide-and-seek, out of the 15 children hiding, 8 have been caught. How many are still hiding?

4. In a game of London Bridge, there are 14 boys and 12 girls. How many children are playing?

5. Three boys run a relay race. The first boy takes 17 seconds for his part of the course; the second boy takes 16 seconds; and the third boy, 12 seconds. How long does it take the boys to run the race?

6. Henry makes a home-run in playing ball. It takes him 5 seconds to get to first base, 6 seconds to get to second base, 4 seconds to get to third base, and 5 seconds to get to the home plate. How long does it take him to make his run?



7. Helen, Margaret, and Ruth are playing house under the trees. Helen has 4 dolls, Margaret has 5, and Ruth 6. How many dolls have the three together?

8. A group of boys are playing Indian. At the beginning of the game, there are 12 boys in the Indian camp and 9 in the White Man's camp. The Indians capture 5 white men and carry them to their camp. How many boys are there then in each camp?

9. Four girls are playing bean bag. Mary's score is 5, 0, 6, 7, 5, 0; Helen's is 7, 7, 5, 0, 0, 6; Marion's is 5, 5, 5,

6, 0, 7; and Gertrude's is 0, 7, 5, 5, 0, 6. Find the total score for each.

10. Who wins the game? The winner's score is how much greater than that made by each of the other players?

[With pencil.]

11. A playground is 248 feet wide and 324 feet long. Find the difference between its length and its width.

12. What is the perimeter of the playground? (See problem 11 for measurements.)

13. Teeter boards, swings, and sand boxes are to be made for a playground. The lumber for the teeter boards costs \$6.75; the lumber for the swing supports, \$9.48; and that for the sand boxes, \$4.50. How much does the lumber cost?

14. Fifty dollars is to be spent for the playground apparatus. How much money is left after paying for the lumber?

15. One hundred dollars is to be spent for improving the grounds. Find the amount left, after spending \$34.78 for shrubs and \$40.50 for a new walk.

16. In estimating the size of a piece of land, men take steps about a yard long. Practice taking steps about 2 feet long, and then, by pacing, make an estimate of the length of your playground. Make an estimate of its width.

17. Estimate the perimeter of your playground, and then correct your estimate by making measurements.

\*18. Estimate the perimeter of your school building. Measure, then find the difference between your estimate and the correct measurement.

## CHAPTER II. MAKING PURCHASES

### 12. At a Book Store

[Without pencil.]

1. Play you are making purchases at a book store. At 5¢ each, how much must you pay for 5 penholders? For 7 drawing pencils?

2. At 6¢ a sheet, how much must be paid for 3 sheets of cardboard? For 10 sheets?

3. The price of colored pencils is 5¢ each. How many can be bought for 35¢? For 45¢?

4. Notebooks are selling for 8¢ apiece. How many can be bought for 25¢? For 40¢?

5. At 7¢ a package, how much must be paid for 6 packages of envelopes? For 12 packages?

6. At 9¢ each, how many blocks of paper can be bought for 50¢? For 75¢?

7. Make a problem about buying 3 penholders at 8¢ apiece.

8. Make a problem asking how many paint brushes at 7¢ each can be bought for 50¢.

9. Use this price list for other problems:

Penholders, 3¢, 5¢.

Paint brushes, 7¢.

Pencils, 2¢, 5¢, 7¢.

Boxes of colored chalk, 5¢.

Scratch blocks, 4¢, 6¢, 8¢.

Colored postal cards, 2 for 5¢.

Notebooks, 9¢.

Scrapbooks, 8¢, 9¢.



**13. Review of Multiplication and Division Facts<sup>1</sup>****I****A. GROUP I**

Name product of:

[Without pencil.]

1.  $1 \times 2.$

2.  $2 \times 3.$

3.  $2 \times 4.$

4.  $1 \times 5.$

$3 \times 2.$

$1 \times 3.$

$1 \times 4.$

$3 \times 5.$

$2 \times 2.$

$4 \times 3.$

$3 \times 4.$

$2 \times 5.$

$4 \times 2.$

$3 \times 3.$

$5 \times 4.$

$4 \times 5.$

$6 \times 2.$

$6 \times 3.$

$4 \times 4.$

$6 \times 5.$

$5 \times 2.$

$5 \times 3.$

$7 \times 4.$

$5 \times 5.$

$7 \times 2.$

$8 \times 3.$

$6 \times 4.$

$9 \times 5.$

$9 \times 2.$

$7 \times 3.$

$9 \times 4.$

$8 \times 5.$

$8 \times 2.$

$9 \times 3.$

$8 \times 4.$

$7 \times 5.$

Change the position of the figures above and give answers.  
 Example: give  $1 \times 2$  as  $2 \times 1$  and  $3 \times 2$  as  $2 \times 3$ .

Name quotient of:

5.  $6 \div 2.$

6.  $3 \div 3.$

7.  $8 \div 4.$

8.  $5 \div 5.$

$4 \div 2.$

$9 \div 3.$

$4 \div 4.$

$15 \div 5.$

$2 \div 2.$

$6 \div 3.$

$12 \div 4.$

$10 \div 5.$

$8 \div 2.$

$12 \div 3.$

$20 \div 4.$

$20 \div 5.$

$12 \div 2.$

$18 \div 3.$

$16 \div 4.$

$30 \div 5.$

$10 \div 2.$

$15 \div 3.$

$28 \div 4.$

$25 \div 5.$

$16 \div 2.$

$21 \div 3.$

$24 \div 4.$

$35 \div 5.$

$14 \div 2.$

$27 \div 3.$

$32 \div 4.$

$45 \div 5.$

$18 \div 2.$

$24 \div 3.$

$36 \div 4.$

$40 \div 5.$

<sup>1</sup> One of the most efficient ways of helping pupils in mastering these facts

Multiply:

[Write products on the folds of a paper.]

$$\begin{array}{r} 1. \ 21 \\ \underline{3} \end{array} \quad \begin{array}{r} 2. \ 20 \\ \underline{4} \end{array} \quad \begin{array}{r} 3. \ 21 \\ \underline{7} \end{array} \quad \begin{array}{r} 4. \ 22 \\ \underline{8} \end{array} \quad \begin{array}{r} 5. \ 20 \\ \underline{5} \end{array} \quad \begin{array}{r} 6. \ 21 \\ \underline{6} \end{array} \quad \begin{array}{r} 7. \ 22 \\ \underline{9} \end{array}$$

$$\begin{array}{r} 8. \ 30 \\ \underline{2} \end{array} \quad \begin{array}{r} 9. \ 31 \\ \underline{5} \end{array} \quad \begin{array}{r} 10. \ 32 \\ \underline{4} \end{array} \quad \begin{array}{r} 11. \ 30 \\ \underline{7} \end{array} \quad \begin{array}{r} 12. \ 33 \\ \underline{6} \end{array} \quad \begin{array}{r} 13. \ 32 \\ \underline{8} \end{array} \quad \begin{array}{r} 14. \ 30 \\ \underline{9} \end{array}$$

$$\begin{array}{r} 15. \ 41 \\ \underline{3} \end{array} \quad \begin{array}{r} 16. \ 42 \\ \underline{5} \end{array} \quad \begin{array}{r} 17. \ 40 \\ \underline{4} \end{array} \quad \begin{array}{r} 18. \ 43 \\ \underline{6} \end{array} \quad \begin{array}{r} 19. \ 44 \\ \underline{7} \end{array} \quad \begin{array}{r} 20. \ 41 \\ \underline{9} \end{array} \quad \begin{array}{r} 21. \ 44 \\ \underline{8} \end{array}$$

$$\begin{array}{r} 22. \ 52 \\ \underline{3} \end{array} \quad \begin{array}{r} 23. \ 50 \\ \underline{5} \end{array} \quad \begin{array}{r} 24. \ 51 \\ \underline{4} \end{array} \quad \begin{array}{r} 25. \ 55 \\ \underline{7} \end{array} \quad \begin{array}{r} 26. \ 25 \\ \underline{6} \end{array} \quad \begin{array}{r} 27. \ 45 \\ \underline{8} \end{array} \quad \begin{array}{r} 28. \ 35 \\ \underline{9} \end{array}$$

 Divide: <sup>1</sup>

$$1. \ 2 \overline{)48} \quad 2. \ 2 \overline{)52} \quad 3. \ 2 \overline{)64} \quad 4. \ 2 \overline{)72} \quad 5. \ 2 \overline{)56} \quad 6. \ 2 \overline{)58}$$

$$7. \ 2 \overline{)76} \quad 8. \ 2 \overline{)98} \quad 9. \ 3 \overline{)126} \quad 10. \ 3 \overline{)189} \quad 11. \ 3 \overline{)243}$$

$$12. \ 3 \overline{)255} \quad 13. \ 3 \overline{)270} \quad 14. \ 3 \overline{)291} \quad 15. \ 3 \overline{)873} \quad 16. \ 3 \overline{)591}$$

$$17. \ 4 \overline{)84} \quad 18. \ 4 \overline{)96} \quad 19. \ 4 \overline{)240} \quad 20. \ 4 \overline{)268} \quad 21. \ 4 \overline{)320}$$

$$22. \ 4 \overline{)340} \quad 23. \ 4 \overline{)196} \quad 24. \ 4 \overline{)232} \quad 25. \ 4 \overline{)148} \quad 26. \ 4 \overline{)184}$$

$$27. \ 5 \overline{)65} \quad 28. \ 5 \overline{)375} \quad 29. \ 5 \overline{)470} \quad 30. \ 5 \overline{)240} \quad 31. \ 5 \overline{)325}$$

$$32. \ 5 \overline{)335} \quad 33. \ 5 \overline{)445} \quad 34. \ 5 \overline{)480} \quad 35. \ 5 \overline{)190} \quad 36. \ 5 \overline{)395}$$

is to give, in connection with the drill on each table, practice in using the numbers in problems similar to those on the page above. In this way the drill work is made to carry over and assist the pupils in actual computing.

<sup>1</sup> Problems may be copied, or quotients may be written on folds of paper placed below problems.

B. GROUP II<sup>1</sup>

Find product of:

[Without pencil.]

1. $1 \times 6.$	2. $2 \times 7.$	3. $1 \times 8.$	4. $2 \times 9.$
$3 \times 6.$	$1 \times 7.$	$3 \times 8.$	$1 \times 9.$
$2 \times 6.$	$4 \times 7.$	$2 \times 8.$	$3 \times 9.$
$4 \times 6.$	$3 \times 7.$	$4 \times 8.$	$5 \times 9.$
$5 \times 6.$	$7 \times 7.$	$6 \times 8.$	$4 \times 9.$
$7 \times 6.$	$5 \times 7.$	$5 \times 8.$	$6 \times 9.$
$6 \times 6.$	$8 \times 7.$	$8 \times 8.$	$8 \times 9.$
$8 \times 6.$	$6 \times 7.$	$7 \times 8.$	$7 \times 9.$
$9 \times 6.$	$9 \times 7.$	$9 \times 8.$	$9 \times 9.$

Change the position of the figures above and give answers.

Example: Give  $1 \times 6$  as  $6 \times 1$ , and  $3 \times 6$  as  $6 \times 3$ .

Name quotient of:

5. $12 \div 6.$	6. $7 \div 7.$	7. $16 \div 8.$	8. $9 \div 9.$
$6 \div 6.$	$21 \div 7.$	$8 \div 8.$	$27 \div 9.$
$18 \div 6.$	$14 \div 7.$	$32 \div 8.$	$18 \div 9.$
$30 \div 6.$	$28 \div 7.$	$24 \div 8.$	$36 \div 9.$
$24 \div 6.$	$42 \div 7.$	$40 \div 8.$	$54 \div 9.$
$36 \div 6.$	$35 \div 7.$	$56 \div 8.$	$45 \div 9.$
$48 \div 6.$	$49 \div 7.$	$48 \div 8.$	$72 \div 9.$
$42 \div 6.$	$63 \div 6.$	$64 \div 8.$	$63 \div 9.$
$54 \div 6.$	$54 \div 7.$	$72 \div 8.$	$81 \div 9.$

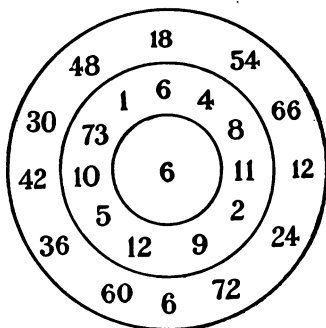
[With pencil.]

9. Multiply: 64 by 2; 16 by 7; 36 by 6; 26 by 8; 46 by 9.  
 10. Divide by 6: 84; 192; 270; 336; 588.

<sup>1</sup> See footnote, page 154.

## II. A SILENT CONTEST

Circles like these pictured here are drawn on a blackboard. One child is chosen leader, and two others are chosen to race. All three take pointers. The leader points to 8, or some other number in the middle circle, and each of the two contestants tries to be the first to touch the number that is the product of the number pointed to by the leader and the number in the center of the circle. If, for example, the leader points to 8, each contestant tries to be the first to touch 48. The leader continues to point, and the other children to race, until the teacher calls a halt and chooses others from the class to take part in the game.



To make the contest a game in division, the leader points to a number in the outer circle, and the contestants find the quotient of that number divided by the number in the center of the circle.

## III. PRACTICE IN UNEVEN DIVISION

Make statements like this: 6 5's are 30. In 32 there are 6 5's and a remainder of 2.

Practice finding the quotients and remainders:

- |                        |                        |                        |                        |                        |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1. $3 \overline{)16}$  | 2. $3 \overline{)32}$  | 3. $4 \overline{)39}$  | 4. $4 \overline{)23}$  | 5. $4 \overline{)31}$  |
| 6. $5 \overline{)38}$  | 7. $5 \overline{)42}$  | 8. $6 \overline{)21}$  | 9. $6 \overline{)44}$  | 10. $6 \overline{)71}$ |
| 11. $6 \overline{)25}$ | 12. $6 \overline{)37}$ | 13. $7 \overline{)81}$ | 14. $7 \overline{)62}$ | 15. $7 \overline{)46}$ |
| 16. $7 \overline{)66}$ | 17. $7 \overline{)41}$ | 18. $8 \overline{)70}$ | 19. $8 \overline{)39}$ | 20. $8 \overline{)51}$ |

21.  $8\overline{)21}$     22.  $8\overline{)75}$     23.  $9\overline{)51}$     24.  $9\overline{)31}$     25.  $9\overline{)41}$   
 26.  $9\overline{)25}$     27.  $9\overline{)68}$     28.  $9\overline{)85}$     29.  $9\overline{)75}$     30.  $9\overline{)110}$

#### 14. The Number Ten in Multiplication and Division

1. Build the table of tens. What do you notice about it?

2. Find answers:

$1 \times 10 = ?$	$8 \times 10 = ?$	$20 \div 10 = ?$	$80 \div 10 = ?$
$3 \times 10 = ?$	$10 \times 10 = ?$	$10 \div 10 = ?$	$70 \div 10 = ?$
$2 \times 10 = ?$	$9 \times 10 = ?$	$30 \div 10 = ?$	$100 \div 10 = ?$
$4 \times 10 = ?$	$11 \times 10 = ?$	$50 \div 10 = ?$	$90 \div 10 = ?$
$6 \times 10 = ?$	$7 \times 10 = ?$	$40 \div 10 = ?$	$110 \div 10 = ?$
$5 \times 10 = ?$	$12 \times 10 = ?$	$60 \div 10 = ?$	$120 \div 10 = ?$

3. How many cents equal 4 dimes? 9 dimes? 6 dimes?

4. How many dimes equal 80 cents? 50 cents? 70 cents?

#### 15. The Number Eleven in Multiplication and Division

[Without pencil.]



1. How many boys are there in a football team?

2. How can the number of boys in 2 teams be found? In 3 teams?

3. Build the table of elevens by addition.

4. What is the peculiar thing about the table that makes it an easy one to learn?

5. Practice giving answers to these tables:

$2 \times 11 = ?$	$8 \times 11 = ?$	$11 \div 11 = ?$	$99 \div 11 = ?$
$1 \times 11 = ?$	$7 \times 11 = ?$	$33 \div 11 = ?$	$88 \div 11 = ?$
$5 \times 11 = ?$	$9 \times 11 = ?$	$22 \div 11 = ?$	$77 \div 11 = ?$
$3 \times 11 = ?$	$11 \times 11 = ?$	$55 \div 11 = ?$	$121 \div 11 = ?$
$4 \times 11 = ?$	$10 \times 11 = ?$	$44 \div 11 = ?$	$110 \div 11 = ?$
$6 \times 11 = ?$	$12 \times 11 = ?$	$66 \div 11 = ?$	$132 \div 11 = ?$

6. How many football teams can be formed from 33 players? From 44 players?

7. How many extra boys are there if 2 football teams are formed from a class of 28 boys?

8. Make a problem about the number of football teams that can be formed from 35 players.

9. Make and solve other problems about football teams.

Find the quotients and remainders:

10. $11 \overline{)24}$	$11 \overline{)50}$	$11 \overline{)40}$	$11 \overline{)58}$	$11 \overline{)69}$
11. $11 \overline{)72}$	$11 \overline{)80}$	$11 \overline{)90}$	$11 \overline{)95}$	$11 \overline{)100}$
12. $11 \overline{)130}$	$11 \overline{)98}$	$11 \overline{)85}$	$11 \overline{)70}$	$11 \overline{)140}$

## 16. The Number Twelve in Multiplication and Division

[Without pencil.]

1. If you were to buy a dozen oranges, how many would you expect to get?

2. How can the number of oranges in 2 dozen be found?  
How can the number in 3 dozen be found?

3. How many are 12 times 2? 2 times 12? 12 times 3?  
3 times 12?

4. Build the table of twelves as far as you can from what  
you know of the number twelve in other tables.

5. Practice giving answers:

$2 \times 12 = ?$	$7 \times 12 = ?$	$24 \div 12 = ?$	$120 \div 12 = ?$
$1 \times 12 = ?$	$10 \times 12 = ?$	$36 \div 12 = ?$	$96 \div 12 = ?$
$3 \times 12 = ?$	$9 \times 12 = ?$	$12 \div 12 = ?$	$84 \div 12 = ?$
$4 \times 12 = ?$	$8 \times 12 = ?$	$72 \div 12 = ?$	$132 \div 12 = ?$
$6 \times 12 = ?$	$11 \times 12 = ?$	$60 \div 12 = ?$	$108 \div 12 = ?$
$5 \times 12 = ?$	$12 \times 12 = ?$	$48 \div 12 = ?$	$144 \div 12 = ?$

6. How many inches are there in a foot? In 6 feet? In  
9 feet?

7. How many feet are there in 96 inches? In 144 inches?

8. Make a problem about 7 dozen eggs. About 8 dozen.

9. Make a problem about the number of feet in 84 inches.

10. Make and solve other problems, using the number 12.

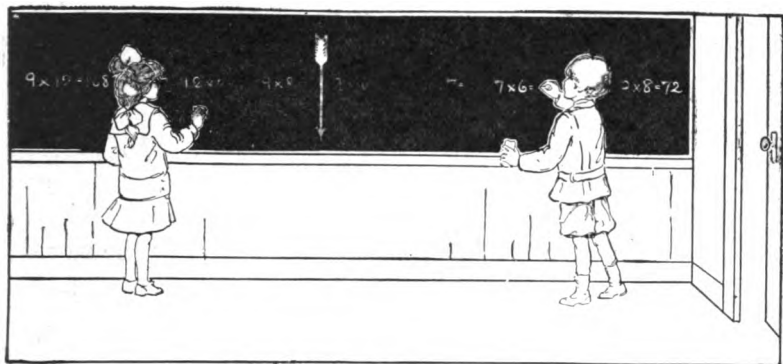
Find the quotients and remainders:

11.  $12 \overline{)13}$        $12 \overline{)18}$        $12 \overline{)65}$        $12 \overline{)54}$        $12 \overline{)100}$

12.  $12 \overline{)25}$        $12 \overline{)30}$        $12 \overline{)75}$        $12 \overline{)79}$        $12 \overline{)125}$

13.  $12 \overline{)40}$        $12 \overline{)50}$        $12 \overline{)85}$        $12 \overline{)90}$        $12 \overline{)150}$

## 17. A Number Race



In preparation for this race, difficult combinations in the multiplication tables are written without their products, in a row across a long blackboard. An arrow is drawn at the half-way point. Two children are chosen for the race. One begins at the right-hand end of the board, the other at the left-hand end; and, at a signal, each begins to write in the missing products as rapidly as possible. The first child to pass the arrow wins the contest.

The difficult facts in division are used in the same way.

Practice giving answers to the following tables, then use them in number races like the one shown in the picture.

Each fact in the multiplication tables should be given in two ways ( $9 \times 6 = 54$ ;  $6 \times 9 = 54$ ).

$4 \times 6 = ? \quad 5 \times 7 = ? \quad 5 \times 8 = ? \quad 3 \times 9 = ? \quad 5 \times 12 = ?$

$7 \times 6 = ? \quad 3 \times 7 = ? \quad 3 \times 8 = ? \quad 5 \times 9 = ? \quad 6 \times 12 = ?$

$5 \times 6 = ? \quad 4 \times 7 = ? \quad 4 \times 8 = ? \quad 4 \times 9 = ? \quad 7 \times 12 = ?$

$8 \times 6 = ? \quad 8 \times 7 = ? \quad 9 \times 8 = ? \quad 3 \times 12 = ? \quad 9 \times 12 = ?$

$9 \times 6 = ? \quad 9 \times 7 = ? \quad 12 \times 8 = ? \quad 4 \times 12 = ? \quad 11 \times 12 = ?$



$$\begin{array}{l}
 36 \div 4 = ? \quad 28 \div 7 = ? \quad 72 \div 8 = ? \quad 108 \div 9 = ? \quad 84 \div 12 = ? \\
 72 \div 6 = ? \quad 56 \div 7 = ? \quad 56 \div 8 = ? \quad 121 \div 11 = ? \quad 72 \div 12 = ? \\
 54 \div 6 = ? \quad 63 \div 7 = ? \quad 96 \div 8 = ? \quad 132 \div 11 = ? \quad 108 \div 12 = ? \\
 27 \div 3 = ? \quad 84 \div 7 = ? \quad 54 \div 9 = ? \quad 63 \div 9 = ? \quad 132 \div 12 = ? \\
 42 \div 7 = ? \quad 48 \div 8 = ? \quad 72 \div 9 = ? \quad 96 \div 12 = ? \quad 144 \div 12 = ?
 \end{array}$$

### 18. Numbers of Six Figures

There are thousands and thousands of people in the world, and thousands and thousands of stars in the sky. In order to express such large quantities, it is necessary to know the meaning of large numbers and how to write them.



Ten hundred or One thousand

1. To get an idea of how many a thousand is, tie sticks together in bundles of one hundred each. Ten such bundles equal one thousand.

2. How many bundles of a thousand sticks each are required to represent ten thousand? To represent one hundred thousand?

One thousand is written 1,000.

Ten thousand is written 10,000.

One hundred thousand is written 100,000.

In writing numbers of from four to six figures, a comma is usually written to separate the three figures at the right from the other figures. This comma divides the number into two parts or **periods** — one for units, and the other for thousands.

Period for thousands	Period for units
-------------------------	---------------------

241 , 536

In reading the numbers, the figures at the right of the comma are thought of as units or ones; and those at the left, as thousands.

8,463 is read 8 thousand, 463.

13,700 is read 13 thousand, 700.

241,536 is read 241 thousand, 536.

Read:

3. 4,000	4. 40,000	5. 43,680	6. 52,042
12,000	100,000	84,049	9,064
4,800	20,000	20,654	18,001
15,525	26,000	43,271	89,008
18,042	75,000	75,244	20,002

Notice that, in writing large numbers, ciphers are used to fill what would otherwise be vacant places.

Twelve thousand is written 12,000.

Twenty-eight thousand, twenty is written 28,020.

Two hundred four thousand, eight is written 204,008.

Write in figures:

7. Eight thousand.
10. One hundred thousand.
8. Eleven thousand.
11. Nine thousand.
9. Twenty thousand.
12. Nine thousand, six hundred.
13. Nine thousand, six hundred twenty-five.
14. Twenty-five thousand, four hundred.

15. Twenty-five thousand, five hundred twenty-two.
16. Nine thousand, six hundred eight.
17. Fifteen thousand, twenty-seven.
18. Twenty-eight thousand, nine hundred eighteen.
19. Forty-five thousand, three hundred seventy-six.

### 19. Roman Numbers

I = 1.      V = 5.      X = 10.      L = 50.      C = 100.

1. Chapters in books are often numbered with letters called Roman numerals. What letter is given the value of 1? Of 5? Of 10? Of 50? Of 100?

In reading such Roman numbers as VI, XX, LXV, how is the value of each number found?

Read:

2. VII	3. XXII	4. XXX	5. LV	6. LXX
XV	XXV	XXXV	LX	LXXI
XVIII	XXVII	XXXVI	LXV	LXXVII

Whenever a letter of less value is placed at the left of another, as in the numbers IX, XL, XC, how is the value of the number found?

IX = 10 - ?      XL = 50 - ?      XC = 100 - ?

Complete, then read:

7. IV = 5 - ?	8. XXIX = 20 + ?	9. XLIX = ?
XIV = 10 + ?	XL = ?	XLVIII = ?
XXIV = 20 + ?	XLV = ?	XC = ?
XIX = 10 + ?	XLIV = ?	XCIV = ?

Write with Roman numerals:

10. 5	11. 20	12. 40	13. 50	14. 80	15. 47
6	23	45	59	85	54
10	34	44	60	90	69
16	39	49	68	95	99

### 20. At the Grocer's

(1) A barrel of flour weighs 196 pounds. How can the weight of 3 such barrels be found? What is the weight?

(2) At the rate of \$4.75 a barrel, how much must be paid for 6 barrels of apples?

(1)

Since each barrel weighs 196 lb., to find the weight of 3 barrels, 196 lb. is multiplied by 3.

3 times 196 lb. = ?

196 lb.	Multiplicand
<u>3</u>	Multiplier
588 lb.	Product

Weight of 3 barrels = 588 lb.

(2)

To find the cost of 6 barrels of apples, \$4.75 is multiplied by 6.

6 times \$4.75 = ?

\$4.75
<u>6</u>
\$28.50

Cost of 6 barrels = \$28.50.

In multiplication, the number to be taken a given number of times is called the **multiplicand**; the number that shows how many times the multiplicand is taken is called the **multiplier**; the answer found is called the **product**.

1. In the second problem above, which number is the multiplicand? Which the multiplier? Which the product?

2. Which terms in the first problem above are called

pounds? Which terms in the second are called dollars and cents? Which term in both problems means *times* and, for that reason, cannot have the name of an object or a measure?

3. In multiplying dollars and cents, before which two terms is the dollar sign written? How many places for cents are pointed off in the product?

[With pencil.]

Find the products, then name and label each term:<sup>1</sup>

4.  $\begin{array}{r} 144 \\ \underline{6} \end{array}$  barrels    5.  $\begin{array}{r} 284 \\ \underline{2} \end{array}$  pounds    6.  $\begin{array}{r} 324 \\ \underline{8} \end{array}$  bushels    7.  $\begin{array}{r} \$8.74 \\ \underline{\phantom{00}} \end{array}$

8. Oranges of a certain size come 150 in a box. How many oranges are there in 8 such boxes?

9. A bushel of potatoes weighs 60 pounds. Find the weight of 6 bushels.

Find how much must be paid:

10. For 2 barrels of flour at \$11.25 a barrel.  
 11. For 8 dozen eggs at 68¢ a dozen.  
 12. For 4 pounds of butter at 65¢ a pound.  
 13. For 9 bushels of potatoes at \$1.95 a bushel.  
 14. For 3 pounds of tea at 75¢ a pound and 2 cans of coffee at 40¢ a can.  
 \*15. Find how much more must be paid for 3 dozen oranges at 58¢ a dozen than for 4 dozen at 38¢ a dozen.<sup>2</sup>

<sup>1</sup> Speed is gained in multiplication if, while performing the process, few words are either thought or spoken. Unnecessary verbs and connectives should be omitted. In multiplying 24 by 8, for example, the pupils should think: 32, 16, 19.

<sup>2</sup> See note, page 141.

**21. Practice in Multiplication**

Multiply the numbers in each column below by the number at the top, testing each answer by multiplying a second time:

4	3	5	6	7
312	316	2,143	30,000	3,045
224	245	4,224	6,042	2,406
345	344	3,544	2,400	3,425
275	456	2,465	5,040	6,340
\$2.44	\$3.65	\$34.52	\$30.65	\$50.40

**22. Timing Work in Multiplication**

Try, within the time limit, to get the correct answers to the problems in this test. If you fail to get all of the problems done, or get an answer wrong, use the problems in Exercise II for practice, then try the test again.

**I. TEST**

[Write answers on the folds of a paper.]

Find products. Time limit,  $1\frac{1}{4}$  minutes.

A. 64	B. 625	C. 560	D. 406	E. \$5.62
<u>2</u>	<u>4</u>	<u>7</u>	<u>8</u>	<u>9</u>

**II. PRACTICE**

A. 1. 42	2. 63	3. 54	4. 60	5. 51	6. 61
<u>4</u>	<u>3</u>	<u>2</u>	<u>7</u>	<u>9</u>	<u>8</u>
B. 7. 326	8. 614	9. 562	10. 625	11. 465	
<u>4</u>	<u>5</u>	<u>8</u>	<u>9</u>	<u>7</u>	

$$\begin{array}{r} \text{C. 12. } 430 \\ \underline{6} \end{array} \quad \begin{array}{r} \text{13. } 640 \\ \underline{8} \end{array} \quad \begin{array}{r} \text{14. } 520 \\ \underline{9} \end{array} \quad \begin{array}{r} \text{15. } 450 \\ \underline{7} \end{array} \quad \begin{array}{r} \text{16. } 560 \\ \underline{6} \end{array}$$

$$\begin{array}{r} \text{D. 17. } 506 \\ \underline{7} \end{array} \quad \begin{array}{r} \text{18. } 405 \\ \underline{5} \end{array} \quad \begin{array}{r} \text{19. } 602 \\ \underline{8} \end{array} \quad \begin{array}{r} \text{20. } 306 \\ \underline{9} \end{array} \quad \begin{array}{r} \text{21. } 604 \\ \underline{6} \end{array}$$

$$\begin{array}{r} \text{E. 22. } \$6.42 \\ \underline{4} \end{array} \quad \begin{array}{r} \text{23. } \$5.64 \\ \underline{6} \end{array} \quad \begin{array}{r} \text{24. } \$3.56 \\ \underline{9} \end{array} \quad \begin{array}{r} \text{25. } \$4.60 \\ \underline{8} \end{array} \quad \begin{array}{r} \text{26. } \$6.54 \\ \underline{7} \end{array}$$

$$\begin{array}{r} \text{27. } \$5.20 \\ \underline{6} \end{array} \quad \begin{array}{r} \text{28. } \$3.62 \\ \underline{4} \end{array} \quad \begin{array}{r} \text{29. } \$6.45 \\ \underline{7} \end{array} \quad \begin{array}{r} \text{30. } \$2.65 \\ \underline{8} \end{array} \quad \begin{array}{r} \text{31. } \$5.26 \\ \underline{9} \end{array}$$

### 23. At a Dry-Goods Store

#### I

(1) How many shirt-waist lengths, each containing 2 yards, can be cut from 150 yards of cloth?

(2) At 8¢ a yard, how many yards of ribbon can be bought for \$2.00?

(1)

Since each shirt-waist length requires 2 yards, to find the number of lengths that can be cut from 150 yards, 150 yards is divided by 2 yards.

$$150 \text{ yd.} \div 2 \text{ yd.} = ?$$

$$\begin{array}{r} 75 \quad \text{Quotient} \\ 2 \text{ yd. } \overline{)150 \text{ yd.}} \quad \text{Dividend} \\ \text{Divisor} \end{array}$$

$$\text{Number of lengths} = 75.$$

(2)

To find the number of yards at 8¢ a yard that can be bought for \$2.00, \$2.00 is divided by \$.08.

$$\$2.00 \div \$.08 = ?$$

$$\begin{array}{r} 25 \\ \$.08 \overline{)2.00} \end{array}$$

$$\text{Number of yards} = 25.$$

In solving a problem in division, we call the number that is to be divided, the **dividend**; and the number by which we divide, the **divisor**. The answer found is called the **quotient**.

1. In the second problem, which number is the dividend? Which the divisor? Which the quotient?

2. In problem 1 on page 168, which terms have the name *yards* given them? Which one shows how many *times* 2 yd. is contained in 150 yd.?

3. In the second problem, which terms can be called *dollars* or *cents*? Which term means *times*?

[With pencil.]

4. Divide 75¢ by 5¢; \$87 by \$3; 180 feet by 3 feet; 424 yards by 8 yards. Name and label the terms. Write the word *times* after each term that means *times*.

5. At \$.05 a yard, how many yards of lace can be bought for \$1.25?

6. Allowing 3 yards for each apron, how many apron lengths can be cut from 54 yards of muslin?

7. How many badges 6 inches long can be cut from a piece of ribbon 144 inches long?

## II

At \$5.40 a yard, what is the cost of  $\frac{1}{4}$  of a yard of velvet?

$$\frac{1}{4} \text{ of } \$5.40 = ?$$

$$\$1.35$$

$$\frac{1}{4} \text{ of } \$5.40 = \$5.40 \div 4.$$

$$4 \overline{) \$5.40}$$

Notice that, in dividing to find a part, the part is of the same name as the whole quantity.



[With pencil.]

1. How is  $\frac{1}{2}$  of 240 yards found? What name should be given to the part found?
2. What is  $\frac{1}{3}$  of \$84?  $\frac{1}{2}$  of 72¢?  $\frac{1}{8}$  of 328 feet?
3. What names should be given to the different quotients in problem 2?
4. At \$3.60 a yard, how much must be paid for  $\frac{1}{3}$  of a yard of cloth?
5. Bead trimming is selling for \$2.48 a yard. Find the cost of  $\frac{1}{4}$  of a yard.
6. A winter coat marked \$25.00 is for sale at half-price. How much must be paid for it?

#### 24. A Test for Division

Divide 24 by 2. What is the quotient?

Multiply the quotient by the divisor 2. The product equals what other term?

$$(1) 492 \div 4 = ?$$

$$\begin{array}{r} 123 \\ 4 \overline{)492} \end{array}$$

$$\text{Test: } 4 \times 123 = 492$$

$$(2) 767 \div 3 = ?$$

$$\begin{array}{r} 255\frac{2}{3} \\ 3 \overline{)767} \end{array}$$

$$\text{Test: } 3 \times 255 + 2 = 767$$

Notice that when there is a remainder in division it is written over the divisor and placed in the quotient. The expression  $\frac{2}{3}$  is equivalent to the expression  $2 \div 3$ .

To test an answer found by division, find the product of the divisor and the quotient and add the remainder. The answer found should equal the dividend.

Divide and test:

[With pencil.]

- |                        |                          |                         |                             |
|------------------------|--------------------------|-------------------------|-----------------------------|
| 1. $3\overline{)732}$  | 2. $6\overline{)1380}$   | 3. $5\overline{)2005}$  | 4. $6\overline{)\$79.32}$   |
| 5. $4\overline{)492}$  | 6. $5\overline{)1754}$   | 7. $6\overline{)6120}$  | 8. $3\overline{)\$92.79}$   |
| 9. $2\overline{)7654}$ | 10. $4\overline{)1952}$  | 11. $7\overline{)7714}$ | 12. $4\overline{)\$65.84}$  |
| 13. $3\overline{)403}$ | 14. $4\overline{)1783}$  | 15. $6\overline{)1807}$ | 16. $3\overline{)\$199.08}$ |
| 17. $2\overline{)725}$ | 18. $7\overline{)24500}$ | 19. $7\overline{)2142}$ | 20. $4\overline{)\$105.77}$ |

Divide:<sup>1</sup>

- |                  |                  |                      |
|------------------|------------------|----------------------|
| 21. 532 by 4.    | 28. 6,545 by 7.  | 35. 4,270 by 7.      |
| 22. 9,680 by 4.  | 29. 3,544 by 4.  | 36. \$20.75 by 5.    |
| 23. 7,932 by 6.  | 30. 97,830 by 3. | 37. \$84.14 by 7.    |
| 24. 89,647 by 2. | 31. 6,520 by 5.  | 38. \$8.75 by \$.05. |
| 25. 9,784 by 3.  | 32. 4,236 by 6.  | 39. \$7.36 by \$.06. |
| 26. 9,840 by 4.  | 33. 3,528 by 7.  | 40. \$9.20 by \$.04. |
| 27. 7,404 by 6.  | 34. 4,008 by 4.  | 41. \$.75 by \$.03.  |

<sup>1</sup> A good game to encourage habits of rapid and accurate computing is the relay race. Problems are written on slips of paper and placed face down on the front desk of each row of children chosen for the race — a slip for each child in the row. At a given signal, each child sitting in a front seat takes a slip, runs to the blackboard and solves the problem. He then runs to his seat and hands the second slip to the child in the seat behind him. This child corrects the work of the first child if necessary, then solves his own problem and returns to his seat. The third child takes the third problem, corrects the work of the other two children, and then solves his own problem. So the race continues until every child in every row in the race has had a turn to solve a problem. The row finishing first with correct answers is considered the winner. The children will soon learn that each error delays their side and is therefore a serious handicap.

## 25. Timing Work in Division

Try, within the time limit, to get the correct answers to the problems in this test. If you fail to get all of the problems done, or if you make a mistake, use for practice the problems in Exercise II, then try the test again.<sup>1</sup>

## I. TEST

Divide and test. Allow 2 minutes for 5 problems.

A.  $6\overline{)426}$  B.  $5\overline{)810}$  C.  $4\overline{)2961}$  D.  $6\overline{)1224}$  E.  $5\overline{)\$7.85}$

## II. PRACTICE

A. 1.  $6\overline{)126}$  2.  $4\overline{)248}$  3.  $6\overline{)486}$  4.  $4\overline{)284}$  5.  $3\overline{)279}$  6.  $5\overline{)455}$

B. 7.  $4\overline{)3296}$  8.  $5\overline{)3560}$  9.  $3\overline{)2748}$  10.  $6\overline{)1458}$

11.  $6\overline{)3750}$  12.  $3\overline{)771}$  13.  $2\overline{)1562}$  14.  $4\overline{)1456}$

15.  $6\overline{)2550}$  16.  $5\overline{)3210}$

C. 17.  $2\overline{)1301}$  18.  $3\overline{)1082}$  19.  $5\overline{)1254}$  20.  $5\overline{)4602}$

21.  $6\overline{)4981}$  22.  $3\overline{)1621}$  23.  $2\overline{)921}$  24.  $4\overline{)2563}$

25.  $6\overline{)1685}$  26.  $5\overline{)3653}$

D. 27.  $2\overline{)1614}$  28.  $3\overline{)2112}$  29.  $4\overline{)3616}$  30.  $6\overline{)1812}$

31.  $5\overline{)3015}$  32.  $4\overline{)2412}$  33.  $2\overline{)1416}$  34.  $5\overline{)4525}$

E. 35.  $3\overline{)\$7.29}$  36.  $4\overline{)\$12.96}$  37.  $2\overline{)\$14.42}$  38.  $3\overline{)\$18.96}$

39.  $6\overline{)\$9.36}$  40.  $4\overline{)\$17.40}$  41.  $5\overline{)\$30.85}$  42.  $3\overline{)\$25.02}$

<sup>1</sup> Problems may be copied before the work is timed, or quotients may be written on folds of paper placed below the problems.

26. How to Solve Difficult Problems <sup>1</sup>

After earning \$5.50, Robert spent \$2.50 for a football and 75¢ for a baseball glove. How much of his money did he have left?

(1) The problem asks for the amount of money that Robert had left from \$5.50 after spending \$2.50 for a football and 75¢ for a baseball glove.

(2) The amount of money left equals the difference between \$5.50 and the sum of \$2.50 and 75¢. To find the amount, add \$2.50 and 75¢, and then subtract their sum from \$5.50.

(3)	\$2.50	\$5.50
	<u>.75</u>	<u>3.25</u>
	\$3.25 Am't spent.	\$2.25 Am't left.

Whenever a problem seems difficult, it will help you, if you follow the order of work given above.

(1) Find what the problem calls for.

(2) Explain how to get the answer.

(3) Do the work required.

Explain, then solve:

[With pencil.]

1. Richard is given a two-dollar bill and sent to the grocery to buy 3 dozen eggs at 58¢ a dozen. How much change should he receive?

<sup>1</sup> For the most part, children should not be expected to analyze the processes by which they get results. For this reason, it is suggested that all oral problems throughout this book be given without analysis and that in the written work, when problems are sufficiently involved to require any form of explanation, the very simple one given above be used. The most valuable assistance a teacher can give a child in his thinking processes is to leave him unhampered in his logic, supplying him with material for thought, and cultivating in him a habit of expressing himself clearly and in orderly fashion, but informally in his own way. This does not mean that a child should not be helped with his vocabulary when he is endeavoring to express himself logically. He will need help of this sort, particularly in problems involving division.

2. Helen buys 2 dozen oranges at 55¢ a dozen, 3 pounds of butter at 62¢ a pound, and 1 package of tea for 65¢. What is the amount of her bill?

3. Margaret has \$1.75 given her by her father and \$1.35 given her by her mother. She spends \$2.48 of this money for a doll's carriage. How much money has she left?

4. Henry goes on a railway journey. He spends \$2.78 for his ticket and 35¢ for his lunch. How much has he left from a five-dollar bill?

5. Ruth has an allowance of \$1.25 a month. She saves  $\frac{1}{5}$  of this allowance. Find how much her savings equal in 6 months.

6. In one month Frank earned \$1.78 selling papers, \$1.25 mowing lawns, and 75¢ doing errands. He spent  $\frac{1}{3}$  of this money, then put the remainder into the bank. How much did he put into the bank?

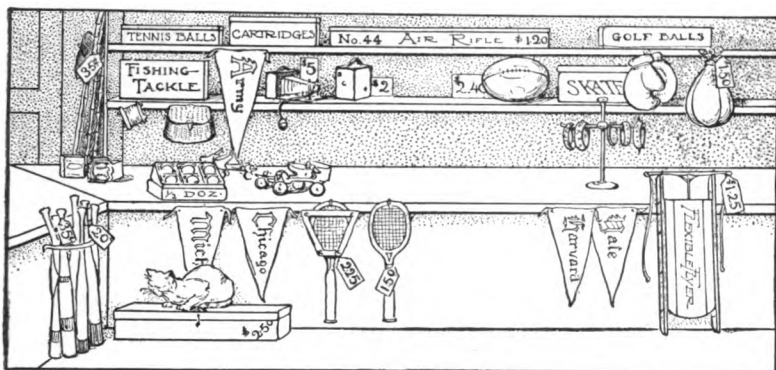
7. Arthur put \$20.00 into a bank, then withdrew \$5.25 at one time and \$8.40 at another time. How much did he have left in the bank?

\*8. At the rate of 5¢ a day, how long does it take to save money enough to buy two books costing 95¢ apiece, and a camera costing \$3.25?

\*9. Tom wants to buy a pony costing \$75, a pony cart costing \$57, and a harness costing \$18. His father has promised to pay  $\frac{1}{2}$  the cost. At the rate of \$5 a month, how long will it take Tom to save money enough to pay the other half?

\*10. Saving \$2.50 a month, how long does it take to save money enough to pay for  $\frac{1}{2}$  the cost of a Victrola at \$45.00?

### 27. Buying Goods for Outdoor Sports



[Without pencil.]

1. Tennis balls are selling at 50¢ apiece. How much must be paid for 2 balls?

2. Frank is going fishing. He buys a fishpole for 45¢, a fishline for 20¢, and a dozen hooks for 8¢. How much does he pay for his outfit?

3. Fred is getting ready to play ball. He buys a ball for 50¢, a bat for 50¢, and a glove for 65¢. Find the cost.

4. Helen has \$5.00. She buys a croquet set for \$2.50 and a tennis racket for \$2.00. How much money has she left?

5. John buys a pair of roller skates for \$1.25 and gives the clerk a two-dollar bill. Find how much change is due him.

6. Two boys buy a football for \$2.40, each paying one half the cost. How much does each boy pay?

7. What is  $\frac{1}{3}$  of the cost of a tennis set bought for \$18?
8. With his father's help, Tom bought a new bicycle for \$32. His father paid  $\frac{1}{4}$  of the cost. How much did Tom pay?
9. Helen's aunt helped her buy a new hammock by paying  $\frac{1}{3}$  of the cost. The price of the hammock was \$3.60. Find how much Helen paid.
10. Choose from this price list articles that you would like to buy. Make and solve problems about them.

Ice skates, \$1.20.

Sleds, \$2.25.

Toboggans, \$5.00.

Baseballs, 75¢, \$1.25.

Catcher's gloves, 50¢, \$1.00.

Bats, 50¢.

Croquet sets, \$2.00.

Tennis rackets, \$2.50.

Golf clubs in sets, \$7.50.

Golf balls, 50¢.

[With pencil.]

11. Baseball suits are selling at \$5.75 each. How much does it cost to fit out a baseball nine with new suits?
12. What is the cost of 4 tennis rackets at \$2.49 apiece?
13. Find the cost of a football suit for \$9.25 and a football for \$2.98.
14. How much more expensive is a toboggan selling for \$8.00 than a pair of snowshoes selling for \$5.25?
15. Three girls bought a croquet set for \$2.55, each paying  $\frac{1}{3}$  of the cost. How much did each girl pay?
- \*16. Tom and Robert bought a tennis set together. They bought a net for \$2.20, and 4 rackets at \$2.75 apiece. Each boy paid  $\frac{1}{2}$  of the cost. How much did the set cost each of them?

**\*17.** Helen had \$5.00. With this money she bought first a pair of roller skates for \$1.25, then 2 tennis balls at 49¢ each. How much money did she have left?

**28. Buying Clothes**

[Without pencil.]

1. John buys a necktie for 50¢ and a collar for 25¢. How much do they cost him?

2. Helen buys 2 hair ribbons at 30¢ apiece. Find how much the ribbons cost.

3. Elizabeth has 72¢ with which to buy lace for a muslin dress. At 9¢ a yard, how many yards can she buy?

4. At 12¢ a yard, how many yards of lawn can be bought for \$1.20?

5. Silk is selling at \$1.60 a yard. Find the cost of  $\frac{1}{4}$  of a yard.

6. William buys a pair of gloves for 50¢ and 2 pairs of mittens at 25¢ a pair. How much must he pay for his purchases?

7. Tom buys a pair of bicycle stockings for 75¢ and gives the clerk a dollar bill. How much change should he receive?

Find how much change should be received:

8. From a fifty-cent piece in buying a necktie for 35¢.

9. From a fifty-cent piece in buying 2 pairs of cuffs at 15¢ a pair.

10. From three quarters in buying a lace collar for 60¢.

11. From a dollar bill in buying a cap for 80¢.

12. From a dollar in buying 3 handkerchiefs at 20¢ each.



13. With the help of this price list, tell the change you would have left from a dollar after making one purchase. From a two-dollar bill after making two purchases.

Handkerchiefs, 15¢, 20¢.

Gloves, 75¢.

Collars, 20¢, 25¢.

Caps, 50¢, 75¢.

Ties, 50¢.

Belts, 25¢, 50¢.

Mittens, 30¢, 50¢.

Hair ribbons, 20¢, 30¢.

[With pencil.]

14. A boy's blouse required 2 yards of percale bought for 28¢ a yard and  $\frac{1}{2}$  dozen buttons bought for 30¢ a dozen. How much did the material cost?

15. Find the cost of the material for a girl's school dress requiring 5 yards of gingham at 65¢ a yard, 4 yards of trimming at 8¢ a yard, and 1 dozen buttons at 25¢ a dozen.

16. Tom had for a baseball outfit a khaki suit costing \$4.75, a sweater costing \$6.40, stockings costing \$.75, shoes costing \$6.50, and a cap costing \$.75. How much did the outfit cost?

17. Margaret had \$20.00 with which to buy clothes for a seashore camp. She bought a play dress for \$4.50, a sweater for \$6.40, a bathing suit for \$3.49, and a rubber bathing cap for \$.50. How much of the money was left?

18. Robert buys shoes costing \$5.50 a pair. He wears out 4 pairs a year. How much do his shoes cost a year?

19. In one year Helen wore out 2 pairs of slippers costing \$3.25 a pair and 2 pairs of shoes costing \$5.75 a pair. How much was her shoe bill for the year?

\*20. Helen's mother bought her a new hat. The milliner

charged \$1.25 for the untrimmed hat, 40¢ a bunch for 2 bunches of flowers, 40¢ a yard for 4 yards of ribbon, 15¢ for lining, 5¢ for an elastic, and \$1.00 for the work in trimming. How much did the milliner charge for the hat when trimmed?

\*21. Cut, from a newspaper, advertisements of children's clothing. With the help of the prices given, make and solve problems of your own.

### 29. Buying Furniture

[Use pencil only when needed.]

1. Eighty dollars is to be spent for kitchen furniture. A cook stove is bought for \$40, a fireless cooker for \$30, and a kitchen table for \$4. How much of the money is left?

2. A new rug is to be bought for the living room for \$50, and one for the dining room for \$30. How much will the two cost?

Find the cost:

3. Of 6 dining-room chairs at \$3 each and 1 dining-room table at \$20.

4. Of a sideboard for \$25 and a set of dishes for \$30.

5. Of 3 rocking chairs at \$6 apiece and 2 easy chairs at \$10 apiece.

6. Of 2 pairs of curtains at \$3.25 a pair.

7. Of 6 pairs of curtains at \$3 a pair and 1 pair for \$5.

8. Iron beds are selling at \$24, brass beds at \$44. What is the difference in the price?

9. I have \$50 to spend. I buy a writing desk for \$25,

a chair for \$6, and then spend the remainder of my money for a bookcase. How much does the bookcase cost?

10. With the help of this price list, make and solve problems of your own about buying furniture:

Kitchen chairs, \$1.50.

Dining-room chairs, \$3, \$4.

Bedroom chairs, \$2.25, \$3.50.

Rockers, \$2.50, \$5.00.

Stands, \$2.00, \$3.50.

Tables, \$12, \$25.

Sideboards, \$20, \$40.

Bookcases, \$15, \$25.

Cook stoves, \$30, \$40.

Ice boxes, \$14, \$20.

Ice-cream freezers, \$3, \$4.

Sets of dishes, \$18, \$30.

[With pencil.]

11. Margaret's mother fitted out Margaret's room with new furniture. The matting cost \$9.75; the curtains, \$6.25; the bed, \$24.98; the dressing-table, \$8.98; a rocking-chair, \$5.75; and other chairs together, \$6.50. How much did the furniture cost?

12. Helen had \$25.00. She spent \$17.98 for a new writing desk. How much of her money did she have left?

13. Helen's mother bought a gas range for \$25.25, an ice box for \$25.75, and a kitchen cabinet for \$42.45. How much did they cost?

14. Robert had \$25.00 with which to fit up a carpenter shop. He spent \$9.75 for a bench and \$7.50 for tools. How much of his money remained unspent?

\*15. Robert's father bought a bookcase for \$22.75, and 3 new pictures at \$5.50 each. How much did he spend?

\*16. Cut, from newspapers, advertisements giving the prices of furniture. Use the prices for problems.

### 30. Review and Practice with the Number Seven

[Without pencil.]

1. Practice adding; then practice subtracting:

10	12	11	15	14	13	16	19	18	17
<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>

2. Count by 7 to 84. 3. Count by 7's into the forties starting in turn with 1, 2, 3, 4, 5, and 6.

Practice until you can add these columns at a steady rate.

4.	4	7	6	7	7	6.	7	7	5	7	4
	7	3	7	4	7		5	3	7	6	7
	5	4	2	5	4		4	7	6	7	5
	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>		7	4	7	2	7
5.	2	7	4	7	7		3	2	4	7	5
	7	5	7	4	5		2	7	4	3	7
	3	7	5	7	7		7	3	7	7	6
	7	2	7	4	5		4	5	6	2	3
	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>		<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>

Add. Work rapidly but carefully.<sup>1</sup>

[With pencil.]

7.	4376	8.	1702	9.	2657	10.	1725	11.	3657
	2400		4241		4770		6577		2743
	5737		5737		5462		5667		1647
	3474		3574		3377		4325		7473
	<u>2751</u>		<u>6244</u>		<u>2476</u>		<u>4454</u>		<u>4835</u>

Subtract, naming the figures in the remainder only.<sup>1</sup>

12.	492	13.	1542	14.	966	15.	600	16.	1405
	<u>177</u>		<u>770</u>		<u>507</u>		<u>174</u>		<u>756</u>

<sup>1</sup> To time pupils, teachers may use as a standard the median record of 7 minutes for problems 7-11 and 1½ minutes for problems 12-16.

17. Practice multiplying 7 by: 3, 2, 5, 4, 6, 9, 7, 8, 11, 12.

18. Find the products:

74	70	73	71	72	70	71	70
<u>2</u>	<u>5</u>	<u>3</u>	<u>6</u>	<u>4</u>	<u>7</u>	<u>8</u>	<u>9</u>

19. Practice dividing the numbers in each column by 7:

14	21	35	42	56	63	77	84
15	25	37	45	58	65	78	86
19	27	39	47	59	68	79	89

[With pencil.]

Multiply, naming figures in the product only.<sup>1</sup>

20. 167 <u>4</u>	21. 273 <u>3</u>	22. 726 <u>5</u>	23. 407 <u>8</u>	24. 507 <u>9</u>
25. 671 <u>6</u>	26. 371 <u>7</u>	27. 715 <u>5</u>	28. 470 <u>9</u>	29. 571 <u>8</u>
30. 407 <u>7</u>	31. 627 <u>4</u>	32. 716 <u>8</u>	33. 706 <u>9</u>	34. 370 <u>6</u>

Divide, naming quotient figures only.<sup>1</sup>

35. 7 $\overline{)8470}$	36. 7 $\overline{)3787}$	37. 7 $\overline{)4340}$	38. 7 $\overline{)6090}$
39. 7 $\overline{)5320}$	40. 7 $\overline{)1428}$	41. 7 $\overline{)6510}$	42. 7 $\overline{)7056}$
43. 7 $\overline{)6034}$	44. 7 $\overline{)3976}$	45. 7 $\overline{)1278}$	46. 7 $\overline{)3204}$
47. 7 $\overline{)4508}$	48. 7 $\overline{)5341}$	49. 7 $\overline{)6608}$	50. 7 $\overline{)6356}$
51. 7 $\overline{)5145}$	52. 7 $\overline{)7682}$	53. 7 $\overline{)3976}$	54. 7 $\overline{)5943}$

<sup>1</sup> For timing problems 20 to 34, allow 4 minutes for 15 problems; for problems 35 to 54, allow 2 minutes for 5 problems.

## CHAPTER III. ON THE FARM

### 31. Children on a Farm

[Without pencil.]

John and Elizabeth live on a farm. Both own poultry and some live stock.

1. One spring Elizabeth set 3 hens with 15 eggs each. All but 7 of the eggs hatched. How many young chicks did Elizabeth have?

2. The same spring John set 4 hens with 12 eggs each. All but 6 of these eggs hatched. How many more young chicks did John have than Elizabeth?



3. John and Elizabeth gather the eggs for their mother. One week John found 96 eggs and Elizabeth 108. How many dozen did each find? How many dozen together?

4. The eggs from the farm are packed in crates each holding 30 dozen. How many dozen eggs are needed to fill 2 crates?

5. John and Elizabeth own a span of ponies worth \$110 apiece. What is the value of the two ponies?

6. John owns 3 sheep. In the spring they are sheared, and the wool is sold. One year the wool from one sheep

weighed 6 pounds; from another, 8 pounds; and from the third sheep, 7 pounds. Find how many pounds of wool there were.

\*7. John owns a calf named Starface, and Elizabeth one named Bessie. Starface weighed 40 pounds when born; and Bessie, 35 pounds. When three months old, Starface weighed 100 pounds, and Bessie 75 pounds. Which calf gained the greater number of pounds? How many pounds more?<sup>1</sup>

### 32. Measuring Farm Produce

#### I. MEASURING MILK

[Use pencil only when needed.]

1. What measures are used for milk, cream, and other liquids?
2. Write the table of liquid measure.<sup>2</sup>
3. How many pint bottles are required to hold 8 quarts of cream?
4. How many quart bottles can be filled from 2 gallons of milk?
5. Twelve pints of cream are to be poured into quart cans. How many cans are needed?
6. Twenty quarts of milk are to be put into gallon cans. Find the number of gallon cans required.
7. At 10¢ a quart, how much must a farmer charge for a gallon of milk?

<sup>1</sup> See footnote, page 141.

<sup>2</sup> If pupils have had insufficient experience in handling pint, quart, and gallon measures, opportunity should be given for measuring that requires the use of them.

8. At 40¢ a pint, how much must be charged for a quart of cream? For a gallon?

9. When milk is sold at 60¢ a gallon, what is the price per quart?

10. Write the abbreviation for *pint*; for *quart*; for *gallon*.

Reduce:

11. 24 pt. to quarts.

15. 12 gal. to quarts.

12. 12 qt. to gallons.

16. 4 gal. to pints.

13. 40 pt. to gallons.

17. 3 qt. 1 pt. to pints.

14. 8 qt. to pints.

18. 2 gal. 3 qt. to quarts.

## II. MEASURING FRUIT, VEGETABLES, AND GRAINS

[Without pencil.]

1. What measures are commonly used for apples, potatoes, oats, and other fruits, vegetables, and grains?

2. Find, by measuring, how many quarts equal a peck and how many pecks equal a bushel.

3. How many times must a quart measure be emptied into a peck measure to fill it? How many times must it be emptied to fill a bushel measure?



4. Make a problem about filling quart boxes from 3 pecks of berries.

5. Make a problem about the number of baskets holding 1 peck each that can be filled from 3 bushels of pears.



## 6. Learn this table:

## TABLE OF DRY MEASURE

2 pints (pt.) = 1 quart (qt.)

8 quarts = 1 peck (pk.)

4 pecks = 1 bushel (bu.)

How much should be received:

7. For 1 peck of popcorn sold at 10¢ a quart?
8. For 1 bushel of apples sold at 40¢ a peck?
9. For 1 quart of cherries sold at 80¢ a peck?
10. For 1 peck of potatoes sold at \$2.00 a bushel?
11. For 2 bushels of tomatoes sold at 40¢ a peck?

## 12. Use this price list for problems:

Cherries, 15¢ a quart..

Peaches, 80¢ a peck.

Pears, 60¢ a peck.

Apples, \$1.60 a bushel.

Potatoes, \$2.00 a bushel.

Tomatoes, \$2.40 a bushel.

Reduce:

[Use pencil only when needed.]

13. 3 pk. to quarts.
14.  $\frac{1}{2}$  bu. to pecks.
15.  $\frac{1}{2}$  bu. to quarts.
16. 48 qt. to pecks.
17. 36 pk. to bushels.
18. 32 qt. to bushels.
19. 1 pk. 5 qt. to quarts.
20. 2 bu. 3 pk. to pecks.
21. 1 bu. 2 pk. to quarts.

Find how much should be received:

22. For 1 bushel of crab apples sold at 48¢ a peck.
23. For 1 peck of blackberries sold at 20¢ a quart.
24. For 1 peck of pears sold at \$3.20 a bushel.

- 25. For 5 bushels of corn sold at \$1.50 a bushel.
- 26. For 9 bushels of wheat sold at \$2.20 a bushel.
- \*27. For 1 barrel ( $2\frac{1}{2}$  bu.) of apples sold at 40¢ a peck.
- \*28. How much is saved in buying 2 barrels of potatoes at \$4.50 a barrel instead of by the peck at 50¢ a peck?

### III. WEIGHING PRODUCE

- 1. By what weight is butter usually sold?
- 2. How many ounces are there in a pound?
- 3. In shipping goods by freight, the charge is often made by the hundredweight. A charge of 25¢ per hundredweight means a charge of 25¢ for each 100 pounds.
- 4. By what weight is hay usually sold?
- 5. Learn this table:

#### TABLE OF WEIGHTS

16 ounces (oz.) = 1 pound (lb.)  
100 pounds = 1 hundredweight (cwt.)  
2,000 pounds = 1 ton (T.)

Find the weight in pounds: [Use pencil only when needed.]

- 6. Of 5 tubs of butter weighing 24 pounds each.
- 7. Of 4 boxes of freight weighing 3 hundredweight each.
- 8. Of 3 loads of hay weighing 1 ton each.
- 9. One thousand pounds is what part of a ton?
- 10. How many tons in a load weighing 3,000 pounds?
- \*11. Find the difference in weight between a load of hay weighing 1 ton and one weighing 18 hundredweight.

## 33. Multipliers Ending in Zero

## I

A bushel of corn weighs 56 pounds. What is the weight of 10 bushels? Of 100 bushels? Of 1,000 bushels?

$$\begin{array}{r} 56 \text{ lb.} \\ 10 \\ \hline 560 \text{ lb.} \end{array}$$

$$\begin{array}{r} 56 \text{ lb.} \\ 100 \\ \hline 5600 \text{ lb.} \end{array}$$

$$\begin{array}{r} 56 \text{ lb.} \\ 1000 \\ \hline 56000 \text{ lb.} \end{array}$$

[Use pencil only when needed.]

1. How is a number changed when it is multiplied by 10? By 100? By 1,000?
2. To multiply a number by 10, annex, or add, — zero.
3. To multiply a number by 100, annex — zeros.
4. To multiply a number by 1,000, annex — zeros.
5. Multiply by 10: 7, 24, 14, 36, 248, 60, 300.
6. Multiply by 100: 6, 8, 45, 92, 40.
7. Multiply by 1,000: 5, 6, 8, 25, 10.

## II

At the rate of \$3 a head, what does it cost to send 40 cattle from a ranch in one state to a ranch in another state? What does it cost to send 300 cattle? To send 2,000 cattle?

$$\begin{array}{r} \$3 \\ 40 \\ \hline \$120 \end{array}$$

$$\begin{array}{r} \$3 \\ 300 \\ \hline \$900 \end{array}$$

$$\begin{array}{r} \$3 \\ 2000 \\ \hline \$6000 \end{array}$$

[Without pencil.]

1. How many zeros are written at the right in a product when a multiplier ends in a zero? When it ends in two zeros? When it ends in three zeros?

Find products:

$$\begin{array}{r} 1. \ 33 \\ \underline{20} \end{array} \quad \begin{array}{r} 3. \ 22 \\ \underline{30} \end{array} \quad \begin{array}{r} 4. \ 42 \\ \underline{20} \end{array} \quad \begin{array}{r} 5. \ 21 \\ \underline{30} \end{array} \quad \begin{array}{r} 6. \ 22 \\ \underline{40} \end{array} \quad \begin{array}{r} 7. \ 44 \\ \underline{20} \end{array}$$

$$\begin{array}{r} 8. \ 21 \\ \underline{200} \end{array} \quad \begin{array}{r} 9. \ 32 \\ \underline{300} \end{array} \quad \begin{array}{r} 10. \ 44 \\ \underline{200} \end{array} \quad \begin{array}{r} 11. \ 22 \\ \underline{4000} \end{array} \quad \begin{array}{r} 12. \ 13 \\ \underline{3000} \end{array}$$

### 34. Two Figures in a Multiplier

An orchard contains 14 rows of trees with 22 trees in each row. How can the whole number of trees be found? What is the number?

To find the whole number of trees, 22 is multiplied by 14.

22 multiplied by 14 equals how many?

Think:

$$\begin{array}{r} 22 \\ 14 \\ \hline 88 \\ 220 \\ \hline 308 \end{array}$$

Since 14 equals 10 and 4, to multiply by 14 we can first multiply by 4 and then by 10 and after that find the sum of the products. 4 times 22 equals 88. 10 times 22 equals 220.  $88 + 220 = 308$ . 22 multiplied by 14 equals 308.

The number of trees in the orchard is 308.

Write:

$$\begin{array}{r} 22 \\ 14 \\ \hline 88 \\ 22 \\ \hline 308 \end{array}$$

In writing the second product, for convenience the zero in units' place is omitted; but a space is left for it so that, in adding the two products, tens will fall under tens and hundreds under hundreds.

Multiply:

$$\begin{array}{r} 1. \ 33 \\ \underline{13} \end{array} \quad \begin{array}{r} 2. \ 44 \\ \underline{21} \end{array} \quad \begin{array}{r} 3. \ 32 \\ \underline{22} \end{array} \quad \begin{array}{r} 4. \ 221 \\ \underline{13} \end{array} \quad \begin{array}{r} 5. \ 123 \\ \underline{24} \end{array}$$

[With pencil.]

6. Play that you are a fruit grower and that you are to set out 14 rows of peach trees with 32 trees in each row. How many trees do you need for your peach orchard?

7. In your apple orchard you have 13 rows of trees with 18 trees in a row. How many trees have you in your apple orchard?

8. In order to ship your apples to the market, you buy 54 barrels at 40¢ apiece. How much do the barrels cost?

9. You hire a man to pick your apples. He charges 50¢ for each barrel of apples that he picks. How much must you pay him for picking 24 barrels of apples?

10. You sell your apples at \$4.25 a barrel. How much do you receive for 42 barrels?

\*11. How much more do you receive for 72 barrels of apples when apples are selling at \$4.50 a barrel than when they are selling at \$4.25 a barrel? (Find the shortest way to solve this problem.)

Multiply:

- |                |                  |                  |
|----------------|------------------|------------------|
| 12. 43 by 22.  | 20. 312 by 32.   | 28. 1,312 by 31. |
| 13. 15 by 13.  | 21. 414 by 23.   | 29. 2,400 by 24. |
| 14. 14 by 13.  | 22. 2,442 by 22. | 30. 346 by 25.   |
| 15. 24 by 21.  | 23. 3,042 by 33. | 31. 283 by 54.   |
| 16. 232 by 21. | 24. 322 by 42.   | 32. 456 by 37.   |
| 17. 142 by 22. | 25. 244 by 14.   | 33. 388 by 63.   |
| 18. 213 by 31. | 26. 413 by 15.   | 34. 2,143 by 48. |
| 19. 132 by 24. | 27. 123 by 44.   | 35. 3,072 by 18. |

## 35. Review and Practice

Write with figures:

[With pencil.]

1. Eight thousand, nine hundred twenty-two.
2. One hundred thousand.
3. Forty-four thousand, three hundred three.
4. Twenty dollars and eight cents.
5. Three hundred nine dollars and five cents.

Add in columns and then across by rows:

6.	7.	8.	9.	10.
11. 765	736	4 657	6 457	24 736
12. 654	7 347	7 576	767	5 767
13. 376	767	6 756	7 656	3 755
14. 577	475	6 777	3 457	47 376
15. 745	3 707	3 765	7 767	27 377
16. <u>374</u>	<u>2 546</u>	<u>7 563</u>	<u>6 776</u>	<u>73 245</u>

Subtract and test:

17. 8 634	18. 906	19. 2 083	20. 5 000	21. 6 000
<u>241</u>	<u>132</u>	<u>1 429</u>	<u>1 429</u>	<u>1 378</u>

Multiply, testing answer by repeating work:

22. 465	23. 8 047	24. 524	25. 343	26. 2 432
<u>7</u>	<u>20</u>	<u>300</u>	<u>34</u>	<u>43</u>

Divide and test:

27. 5 $\overline{)879}$	28. 4 $\overline{)1796}$	29. 3 $\overline{)2997}$	30. 6 $\overline{)1980}$
31. 7 $\overline{)2961}$	32. 6 $\overline{)1446}$	33. 4 $\overline{)2592}$	34. 6 $\overline{)4932}$

Find answers:

35.  $\$24.25 + \$5.24 + \$6.65 + \$7.40 + \$35.67 + \$8.70 = ?$

36.  $\$116.37 + \$43.75 + \$27.24 + \$576.37 + \$375.70 = ?$

37.  $\$27.08 - \$13.05 = ?$

40.  $\$24.16 \times 22 = ?$

38.  $\$40.75 - \$20.38 = ?$

41.  $\$74.20 \times 32 = ?$

39.  $\$38.76 \times 8 = ?$

42.  $\$44.82 \div 6 = ?$

### 36. First Steps in Long Division

#### I

What is the distance in yards across a field 741 feet wide?

Since 1 yard equals 3 feet, the width of the field in yards equals  $741 \text{ feet} \div 3 \text{ feet}$ .

$$741 \text{ ft.} \div 3 \text{ ft.} = ?$$

Solution by Long Division

$$\begin{array}{r}
 247 \\
 3 \overline{) 741} \\
 \underline{6} \phantom{00} \quad (2 \times 3) \\
 14 \phantom{00} \quad \text{New dividend} \\
 \underline{12} \phantom{00} \quad (4 \times 3) \\
 21 \phantom{00} \quad \text{New dividend} \\
 \underline{21} \phantom{00} \quad (7 \times 3)
 \end{array}$$

Width of field = 247 yd.

3 is contained in 7, 2 times. The 2 is written in the quotient, and the divisor 3 is then multiplied by it.  $2 \times 3 = 6$ . The 6 is subtracted from the 7, leaving a remainder of 1. The next figure in the dividend (4) is written with the remainder (1), forming the new dividend 14.

3 is contained in 14, 4 times.  $4 \times 3 = 12$ . Subtracting 12 from 14, the remainder found is 2. The next figure in the dividend (1) is written with the remainder (2), forming the new dividend 21.

3 is contained in 21, 7 times. Since  $7 \times 3$  is 21, there is no remainder.  $741 \div 3 = 247$ .  $741 \text{ ft.} = 247 \text{ yd}$ .

[With pencil.]

1. Divide 9,732 by 4, first by short division, then by long division. Notice that the two forms of division are performed alike, but that in short division we write only the quotient, keeping the other steps and figures in mind.

2. Divide by long division: 7,035 by 3; 6,980 by 5; 2,275 by 7.<sup>1</sup>

Since short division is a much quicker process, it is used whenever possible. When a divisor is a number under 13, short division is used. When a number is greater than 12, it is usually more convenient to use long division.

## II

A farmer ships 21 barrels of produce weighing 4851 lb. The average weight of each barrel is how much?

The average weight of each barrel equals 4851 lb. divided by 21.

$$\begin{array}{r} 231 \\ 21 \overline{) 4851} \\ \underline{42} \phantom{00} \\ 65 \phantom{00} \\ \underline{63} \phantom{00} \\ 21 \phantom{00} \\ \underline{21} \phantom{00} \\ 0 \phantom{00} \end{array}$$

Since 21 is contained in 48 twice, 2 is written in the quotient above the 8 and 21 is multiplied by it.

In multiplying 21 by 2, say, 2, 4, then subtract the product 42 from 48, saying 6.

Next bring down the 5 from the dividend forming the new dividend 65.

Since 21 is contained in 65, 3 times, 3 is written in the quotient above the 5 and 21 is multiplied by it.

In multiplying 21 by 3, say, 3, 6, then subtract the product 63 from 65, saying 2.

Next bring down the 1 from the dividend forming the new dividend 21.

Since 21 is contained in 21 once, 1 is written in the quotient above the 1, and 21 is multiplied by it.

In multiplying 21 by 1, say, 1, 2. In subtracting 21 from 21, say: there is no remainder.

For the answer, say: The average weight of each barrel is 231 pounds.

[With pencil.]

Divide 4260 by 20. 3690 by 30. 252 by 21. 4664 by 22. 3813 by 31. 6816 by 32. 8720 by 20. 6390 by 30.

<sup>1</sup> This type of problem should be used only as an aid in mastering the first steps in long division. It should not be continued long enough for the children to form a habit of using long division when divisors contain only one figure.



## III

1. Divide 7,488 by 24.

[With pencil.]

When it is difficult to tell how many times the divisor is contained in any part of the dividend, the first figures of each are used as guides. In dividing 7,488 by 24, we divide 7, the first figure in the dividend, by 2, the first figure in the divisor. Because 2 is contained in 7, 3 times, we think that 24 may be contained in 74, 3 times; so we use 3 as a trial figure in the quotient.

Sometimes it is necessary to try two or three figures in the quotient before the right one is found. The quotient must be made smaller whenever the product found is greater than the part of the dividend in use. It must be made larger whenever the remainder found is larger than the divisor.

2. Divide 966 by 23; 7,392 by 32; 775 by 25.

3. A ranchman starting in business has \$2,480 with which to buy young cattle. At \$20 apiece, how many can he buy?

4. A farmer has 560 bushels of corn to ship. How many wagon-loads of 40 bushels each will the corn make?

5. Find how many days there are in 504 hours.

6. A freight train traveling at the rate of 768 miles in 24 hours goes at what rate of speed per hour?

Find the quotients by long division:

7.  $20 \overline{)4640}$

8.  $22 \overline{)464}$

9.  $31 \overline{)372}$

10.  $32 \overline{)3872}$

11.  $30 \overline{)6930}$

12.  $22 \overline{)7062}$

13.  $31 \overline{)9951}$

14.  $32 \overline{)6784}$

15.  $21 \overline{)6762}$

16.  $23 \overline{)5082}$

17.  $31 \overline{)6572}$

18.  $32 \overline{)7392}$

19.  $23 \overline{)276}$

20.  $24 \overline{)2904}$

21.  $33 \overline{)6996}$

22.  $34 \overline{)7242}$

$$840 \div 24 = 35. \quad \text{Test: } 24 \times 35 = 840.$$

Divide and test:

- |                           |                           |                           |                            |
|---------------------------|---------------------------|---------------------------|----------------------------|
| 23. $23 \overline{)253}$  | 24. $42 \overline{)504}$  | 25. $33 \overline{)693}$  | 26. $25 \overline{)775}$   |
| 27. $33 \overline{)726}$  | 28. $43 \overline{)1333}$ | 29. $44 \overline{)968}$  | 30. $32 \overline{)992}$   |
| 31. $41 \overline{)861}$  | 32. $21 \overline{)462}$  | 33. $31 \overline{)713}$  | 34. $25 \overline{)525}$   |
| 35. $21 \overline{)6804}$ | 36. $42 \overline{)8862}$ | 37. $52 \overline{)6396}$ | 38. $32 \overline{)10272}$ |

### 37. Measuring Farm Land

In measuring the length or the width of a field, the rod is often used.

$$\text{A rod} = 16\frac{1}{2} \text{ feet.}$$

1. Mark off on your schoolroom floor a distance equal to a rod. Pace the distance.

2. Choose a classmate. Try to stand so that the distance between you and him is exactly a rod. Measure the distance.

3. Draw a rectangle 4 inches wide and 6 inches long. Call the rectangle a field 20 rods wide and 30 rods long. Find the perimeter of the field in rods.

4. In buying and selling land, the acre is used. An acre may be thought of as a square about 209 feet on a side.<sup>1</sup>

5. Pace the boundaries of an acre of land on your school grounds, or in a vacant lot or field.

\*6. Find, by pacing, an estimate of the number of acres in your school grounds.

<sup>1</sup> A square containing an acre is, more exactly, 208 feet  $8\frac{1}{2}$  inches on a side.

**38. A Farmer's Crops**

[With pencil.]

Mr. Brown has a small farm on which he raises corn, wheat, oats, and hay.



1. His land yields 40 bushels of corn to an acre. How many acres must he plant with corn to raise 1,400 bushels?

2. His wheat fields yield 22 bushels to an acre. Find how many acres he must plant with wheat to raise 550 bushels.

Find the number of bushels:

3. Of corn raised on 30 acres yielding 40 bushels to an acre.

4. Of wheat raised on 20 acres yielding 22 bushels to an acre.

5. Of oats raised on 14 acres yielding 30 bushels an acre.

6. In one year Mr. Brown received for his corn \$940; for his wheat \$980; for his oats \$650. How much money did he receive for these crops?

7. He sold his hay for \$992 at the rate of \$32 a ton. How many tons did he sell?

8. Crops are often injured by insects. For this reason, birds that destroy insects are often considered a farmer's best friends. A meadow lark will eat as many as 75 young grasshoppers in a day. At that rate how many grasshoppers will a flock of 40 birds destroy in a day? In a week?

**\*9.** At the rate of 50 insects a day, how many insects will be destroyed by one bird in a month (30 days)? In a summer season lasting 5 months?

### 39. Farm Animals

[With pencil.]

**1.** Cattle, horses, sheep, and hogs are to be bought for a farm. At the rate of \$70 apiece, how many cows can be bought for \$980?

**2.** Find the number of lambs at \$8 each that can be bought for \$464.

What is the cost:

**3.** Of 6 horses at \$175 apiece?

**4.** Of 12 cows at \$82 apiece?

**5.** Of 8 sheep at \$12.50 apiece?

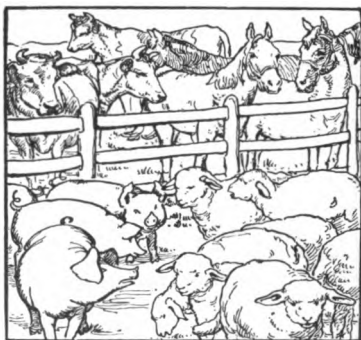
**6.** Of 18 pigs at \$12.75 apiece? Of 4 at \$11.20 apiece?

**7.** Find the total cost of the animals named in problems 3, 4, 5, and 6.

**8.** A good cow yields 8 quarts of milk a day. At this rate how many cows are required to furnish 184 quarts of milk a day?

**9.** Find the number of 5-gallon cans required to hold 160 quarts of milk.

**10.** The cream from a cow yielding rich milk will make 14



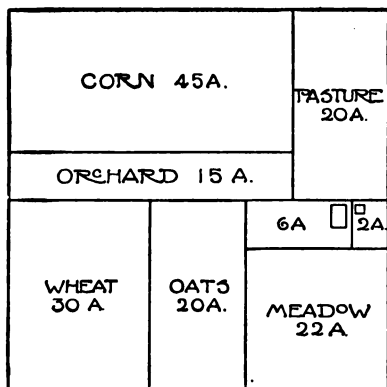
pounds of butter in a week. How much is the butter worth at 52¢ a pound?

11. Farmers who raise corn often buy young cattle to fatten. What is the increase in the weight of a steer weighing 928 pounds when bought and 1,650 pounds when sold?

\*12. How much more should be received for 20 head of cattle sold at \$87.50 apiece than for the same number sold at \$68.00 each?

#### 40. A Play Farm

[With pencil.]



Play that you own this farm and that you raise on it poultry, cattle, horses, corn, grain, and fruit.

1. Find how many acres there are in the farm.

2. In your poultry yard there are 108 chickens, 24 turkeys, 18 geese, and 24 ducks. What is the total

number of poultry?

3. You are to build a new fence around the pasture and then to buy some cattle. The pasture is 40 rods wide and 80 rods long. How many rods of fencing are required for the four sides of the pasture?

4. You have \$575 with which to buy young cattle. At \$25 apiece, how many can you buy?

5. You are to buy a span of horses at \$175 apiece, a double

harness for \$60, and a wagon for \$125. How much will this outfit cost you?

6. From 20 acres of oats you harvest 660 bushels. How many bushels does this make to an acre?

7. How many bushels to an acre do you receive from your wheatfield when from 30 acres you harvest 720 bushels?

How much should you receive:

8. For 700 bushels of wheat sold at \$2.20 a bushel?

9. For 300 bushels of oats sold at 90¢ a bushel?

10. For 900 bushels of corn sold at \$1.25 a bushel?

11. You sell 90 barrels of apples at \$4.25 a barrel and 30 barrels at \$4.00 a barrel. How much do you receive for your apples?

12. It costs you \$3,975 to run your farm for a year. For the same year you receive \$5,580 for your produce. How much money do you make from your farm?

\*13. The farm is  $\frac{1}{2}$  mile square. How many feet of fencing are required to enclose it? (1 mile equals 5,280 feet.)

\*14. How much more do you receive for 200 bushels when wheat is selling at \$2.20 a bushel than when it sells at \$1.80 a bushel?

\*15. At the rate of \$177.00 for 60 bushels of corn for seed, how much must you pay for 40 bushels?

16. Use this price list for problems:

Wheat, \$2.20 a bushel.

Corn, \$1.50 a bushel.

Oats, 90¢ a bushel.

**41. Review and Practice**

Write with figures:

[With pencil]

1. Ten thousand, ninety-three.
2. Seventy-five thousand, eight.
3. Two hundred thousand, two hundred.
4. One hundred seventy dollars and fifty cents.
5. One thousand forty dollars and seventy-five cents.

Practice adding at a steady rate:

$$\begin{array}{r} 6. \quad 4 \quad 2 \quad 5 \quad 7 \quad 7 \\ \quad 7 \quad 6 \quad 4 \quad 4 \quad 6 \\ \quad 5 \quad 7 \quad 4 \quad 5 \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 4 \quad 4 \quad 5 \quad 4 \quad 6 \\ \quad 3 \quad 6 \quad 7 \quad 7 \quad 7 \\ \quad 6 \quad 5 \quad 5 \quad 6 \quad 6 \\ \quad 4 \quad 5 \quad 6 \quad 7 \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 5 \quad 7 \quad 2 \quad 3 \quad 4 \\ \quad 4 \quad 5 \quad 5 \quad 4 \quad 7 \\ \quad 6 \quad 3 \quad 6 \quad 5 \quad 5 \\ \quad 5 \quad 0 \quad 7 \quad 5 \quad 6 \\ \quad 4 \quad 7 \quad 7 \quad 6 \quad 7 \\ \quad 7 \quad 4 \quad 6 \quad 7 \quad 6 \\ \quad 4 \quad 5 \quad 1 \quad 3 \quad 5 \\ \quad 4 \quad 7 \quad 4 \quad 6 \quad 4 \\ \hline \end{array}$$

Add by columns, then across by rows. Test each sum.

	9.	10.	11.	12.	13.
14.	376	676	5676	6476	5676
15.	147	567	675	16677	675
16.	636	765	5667	1376	567
17.	375	3766	4456	206	2467
18.	577	766	3676	3076	17666
19.	465	677	2766	6576	6575
20.	<u>676</u>	<u>4355</u>	<u>3777</u>	<u>26768</u>	<u>14767</u>

Subtract and test:

21.	5620	22.	4020	23.	1000	24.	8000	25.	5000
	<u>4230</u>		<u>3141</u>		<u>842</u>		<u>2485</u>		<u>1627</u>

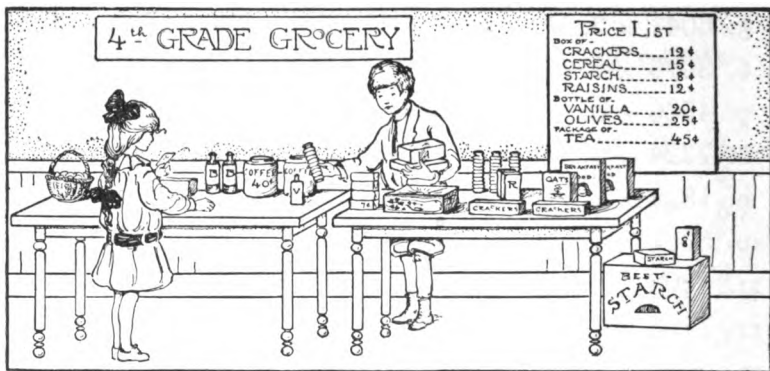
Find products and quotients. Test all work. [With pencil.]

- |                       |                       |                        |
|-----------------------|-----------------------|------------------------|
| 1. $1675 \times 2$ .  | 26. $240 \times 36$ . | 51. $1922 \div 31$ .   |
| 2. $5364 \times 4$ .  | 27. $745 \times 47$ . | 52. $903 \div 21$ .    |
| 3. $1345 \times 3$ .  | 28. $302 \times 64$ . | 53. $1302 \div 42$ .   |
| 4. $2760 \times 3$ .  | 29. $641 \times 23$ . | 54. $1683 \div 33$ .   |
| 5. $6047 \times 2$ .  | 30. $725 \times 62$ . | 55. $1512 \div 72$ .   |
| 6. $3076 \times 5$ .  | 31. $416 \times 71$ . | 56. $1312 \div 41$ .   |
| 7. $4506 \times 6$ .  | 32. $376 \times 45$ . | 57. $1364 \div 62$ .   |
| 8. $7324 \times 6$ .  | 33. $706 \times 81$ . | 58. $1749 \div 53$ .   |
| 9. $1324 \times 7$ .  | 34. $627 \times 25$ . | 59. $3025 \div 25$ .   |
| 10. $5067 \times 7$ . | 35. $167 \times 63$ . | 60. $7276 \div 34$ .   |
| 11. $4208 \times 8$ . | 36. $605 \times 44$ . | 61. $4920 \div 41$ .   |
| 12. $1765 \times 8$ . | 37. $327 \times 56$ . | 62. $5246 \div 43$ .   |
| 13. $2071 \times 9$ . | 38. $764 \times 84$ . | 63. $9088 \div 32$ .   |
| 14. $3645 \times 9$ . | 39. $675 \times 76$ . | 64. $6640 \div 20$ .   |
| 15. $65 \times 40$ .  | 40. $1296 \div 2$ .   | 65. $7488 \div 24$ .   |
| 16. $36 \times 30$ .  | 41. $2934 \div 3$ .   | 66. $7320 \div 40$ .   |
| 17. $72 \times 60$ .  | 42. $4392 \div 6$ .   | 67. $19,902 \div 62$ . |
| 18. $37 \times 40$ .  | 43. $4880 \div 5$ .   | 68. $16,401 \div 71$ . |
| 19. $67 \times 50$ .  | 44. $2691 \div 3$ .   | 69. $3796 \div 73$ .   |
| 20. $46 \times 300$ . | 45. $1022 \div 7$ .   | 70. $3392 \div 64$ .   |
| 21. $75 \times 500$ . | 46. $2067 \div 3$ .   | 71. $4514 \div 74$ .   |
| 22. $64 \times 600$ . | 47. $1384 \div 2$ .   | 72. $12,871 \div 61$ . |
| 23. $56 \times 700$ . | 48. $3990 \div 7$ .   | 73. $30,960 \div 72$ . |
| 24. $76 \times 400$ . | 49. $2796 \div 6$ .   | 74. $27,153 \div 63$ . |
| 25. $421 \times 24$ . | 50. $5364 \div 6$ .   | 75. $34,079 \div 53$ . |



## CHAPTER IV. A SCHOOLROOM STORE

### 42. Selling Groceries



The children pictured here have a schoolroom store. The boys and girls in the class first practiced making change with toy money; then they brought from home empty boxes, cans, and bottles neatly sealed. The prices were marked on the articles, a clerk was chosen, and the children took turns in making purchases.

1. The children used all the common coins in our money and all the bills from one dollar to ten dollars. What coins did they use? What bills?

[Without pencil.]

2. Give the value in cents of:

- |                |                 |                            |
|----------------|-----------------|----------------------------|
| 1 dime.        | 3 dimes.        | 4 dimes and 3 nickels.     |
| 1 nickel.      | 7 nickels.      | 1 quarter and 3 dimes.     |
| 1 quarter.     | 2 quarters.     | 1 half-dollar and 2 dimes. |
| 1 half-dollar. | 2 half-dollars. | 3 quarters and 2 dimes.    |

Find the total cost of each pupil's purchase:

3. Robert buys a pound of tea for 65¢ and a box of crackers for 12¢.
4. Clara buys a bottle of blueing for 15¢, a box of starch for 8¢, and a cake of soap for 7¢.
5. Margaret buys 2 cans of coffee at 40¢ a can.
6. John buys 2 dozen eggs at 60¢ a dozen.
7. Henry buys a bottle of olives for 25¢ and a box of raisins at 22¢ a box.
8. Fred buys 2 boxes of cereal at 15¢ a box and a bottle of vanilla for 20 cents.

Find the amount of change due each of these children:

9. Marion buys a box of raisins for 22¢ and gives the clerk 25¢.
10. William buys  $\frac{1}{2}$  dozen eggs at 60¢ a dozen and gives the clerk 50¢.
11. Tom buys 1 lb. of tea for 60¢ and gives the clerk \$1.00.
12. Ellen buys 1 pound of butter at 60¢ a pound and gives the clerk 75¢.

Name one set of coins that might be given as change:

13. From a 25-cent piece in selling a cake of soap for 8¢.
14. From a 50-cent piece in selling a can of corn for 25¢.
15. From a dollar bill in selling a can of coffee for 60¢.
16. Get from your grocer or from advertisements prices charged for groceries. Use these prices for problems.

## 43. Paying Bills

The sign @ is read at.

[With pencil.]

1. Find the amount due on the following bill:

THE FOURTH GRADE GROCERY					
NEW YORK, N.Y., Nov. 14, 1920.					
SOLD TO Miss Margaret Brown 44 Park Ave.,					
Jan. 15	4 Doz. eggs @ 62c.				
" 18	4 Lb. butter @ 60c.				
" 19	2 Doz. oranges @ 45c.				
" 27	6 Pkg. breakfast food @ 25c.				

Find the amounts due the Fourth Grade Grocery:

2. April 8, William Robinson bought 2 lb. tea at 50¢ a lb.; April 15, 3 bottles of olives at 25¢ a bottle; April 27, 8 boxes of raisins at 22¢ a box.

3. Helen Martin bought, May 4, 1 quart of maple sirup at \$2.80 a gallon; May 12, 4 dozen eggs at 62¢ a dozen; May 20, 1 box of domino sugar at 50¢ a box.

Find the amount due on each of the following bills:

- |                            |                           |
|----------------------------|---------------------------|
| 4. 1 boy's suit @ \$15.98. | 5. 1 girl's hat @ \$3.75. |
| 2 pairs of shoes @ \$6.25. | 1 girl's coat @ \$15.75.  |
| 1 pair of mittens @ \$.45. | 2 dresses @ \$9.98.       |

- |                             |                                    |
|-----------------------------|------------------------------------|
| 6. 2 saws @ \$1.87.         | 7. 1 doll carriage @ \$2.75.       |
| 4 planes @ \$.72.           | 1 large doll @ \$1.49.             |
| 1 hammer @ \$.68.           | 1 set of dishes @ \$1.98.          |
| 1 chisel @ \$.28.           | 3 toy chairs @ \$.45.              |
| 8. 1 sweater @ \$6.75.      | 9. 14 yd. of silk @ \$2.25.        |
| 3 waists @ \$1.89.          | 8 yd. of lining @ 37¢.             |
| 6 pairs of stockings @ 65¢. | 2 doz. buttons @ 37¢<br>per dozen. |

Find the amount of change that should be received from \$20.00 in paying each of the two following bills:<sup>1</sup>

- |                                |                            |
|--------------------------------|----------------------------|
| *10. 1 pair of shoes @ \$5.75. | *11. 24 qt. of milk @ 16¢. |
| 1 pair of slippers @ \$3.48.   | 10 pt. cream @ 50¢.        |
| 1 pair of overshoes @ \$1.50.  | 14 lb. butter @ 62¢.       |

#### 44. Selling Part of a Pound

##### I

[Without pencil.]

1. Butter is selling at 62¢ a pound. How can the price of  $\frac{1}{2}$  pound be found? What is the price?
2. Coffee is selling at 40¢ a pound. How can the price of  $\frac{1}{4}$  of a pound be found? Of  $\frac{3}{4}$  of a pound?
3. At 12¢ a pound, how much must be charged for  $\frac{1}{2}$  pound of crackers? For  $\frac{1}{4}$  of a pound? For  $\frac{3}{4}$  of a pound?
4. Find  $\frac{1}{2}$  of 40¢. Of 60¢; 28¢; 48¢; 50¢; 70¢.
5. Find  $\frac{1}{4}$  of 20¢. Of 24¢; 36¢; 44¢; 48¢; 60¢; 80¢.
6. Find  $\frac{3}{4}$  of 20¢. Of 24¢; 36¢; 44¢; 48¢; 60¢; 80¢.
7. How many ounces are there in a pound?

<sup>1</sup> See footnote, page 141.

8. How many ounces are there in  $\frac{1}{2}$  pound? In  $\frac{1}{4}$  of a pound? In  $\frac{3}{4}$  of a pound?

9. What part of a pound is a 4-ounce weight? An 8-ounce weight? A 12-ounce weight?

10. Tea is selling for 80¢ a pound. How much must be charged for a package weighing 8 ounces?

11. How much must be charged for 4 ounces of candy selling at 16¢ a pound?

12. Use this price list for problems in selling candy weighing 4 ounces; 8 ounces; 12 ounces:

Peanut candy, 20¢ a pound.	Peppermint candy, 40¢ a pound.
Chocolates, 80¢ " "	Mixed candy, 48¢ " "

## II

[Without pencil.]

1. How many ounces are there in  $\frac{1}{8}$  of a pound?

2. How is  $\frac{1}{8}$  of a number found?

3. Find  $\frac{1}{8}$ , then  $\frac{3}{8}$ , of 80. Of 16; 40; 24.

4. Find  $\frac{1}{8}$ , then  $\frac{5}{8}$ , of 64. Of 72; 56; 48.

5. Find  $\frac{1}{8}$ , then  $\frac{7}{8}$ , of 32. Of 88; 96.

6. Mixed spice is selling at 32¢ a pound. How much must be charged for  $\frac{1}{8}$  of a pound?

Find how much should be charged:

7. For  $\frac{1}{8}$  of a pound of pepper selling at 40¢ a pound.

8. For  $\frac{5}{8}$  of a pound of cinnamon, at 32¢ a pound.

9. For  $\frac{7}{8}$  of a pound of cloves, at 48¢ a pound.

10. For 2 ounces of nutmegs, at 80¢ a pound.

## 45. Marking Down Prices

## I

[Without pencil.]

Merchants sometimes throw off a part of the price marked on goods. Selling an article marked 40¢ "at  $\frac{1}{5}$  off" means that  $\frac{1}{5}$  of 40¢, or 8¢, is taken from the price.

1. At a bargain sale in the Fourth Grade Grocery, candy marked at 20¢ a box sold at  $\frac{1}{5}$  off. How much was taken from the price?

2. Peaches marked at 30¢ a can sold at  $\frac{1}{6}$  off. How much was taken from the price of the peaches?

3. How much should be taken from the price of coffee when it is marked at 35¢ a can and sells at  $\frac{1}{7}$  off?

4. How is  $\frac{1}{5}$  of a number found? How is  $\frac{1}{6}$  found? How is  $\frac{1}{7}$  found?

5. Find  $\frac{1}{5}$ , then  $\frac{3}{5}$ , of 15. Of 20; 25; 40; 60.

6. Find  $\frac{1}{6}$ , then  $\frac{5}{6}$ , of 12. Of 60; 24; 66; 72.

7. Find  $\frac{1}{7}$ , then  $\frac{6}{7}$ , of 14. Of 70; 77; 42; 49; 84.

Find how much should be taken from the price:

8. Of a cake of soap marked 10¢, selling at  $\frac{1}{5}$  off.

9. Of a glass of jelly marked 18¢, selling at  $\frac{1}{6}$  off.

10. Of a package of tea marked 35¢, selling at  $\frac{1}{7}$  off.

11. Of a bottle of olives marked 25¢, selling at  $\frac{1}{5}$  off.

12. Of a can of corn marked 24¢, selling at  $\frac{1}{6}$  off.

13. Of a can of peaches marked 40¢, selling at  $\frac{1}{4}$  off.

14. Of a box of raisins marked 15¢, selling at  $\frac{1}{3}$  off.

## II

[With pencil.]

John Wanamaker is selling straw hats at  $\frac{2}{5}$  off. How much should be taken from the price of a hat marked \$1.75?

$$\begin{array}{r} 5 \overline{) \$1.75} \\ \$ .35 \\ \underline{\phantom{\$} 2} \\ \$ .70 \end{array}$$

The amount taken off =  $\frac{2}{5}$  of \$1.75.

To find  $\frac{1}{5}$  of \$1.75, divide by 5.  $\frac{1}{5}$  of \$1.75 = \$.35.

To find  $\frac{2}{5}$  of \$1.75, multiply \$.35 by 2.

$\frac{2}{5}$  of \$1.75 = \$.35  $\times$  2 or \$.70.

\$.70 is the amount to be taken from the price.

1. Find  $\frac{3}{4}$  of 84. Of 96; 128; 144; 272.
2. Find  $\frac{2}{3}$  of 147. Of 324; 495; 891; 1455.
3. Find  $\frac{5}{8}$  of 152. Of 216; 504; 752; 3312.
4. Find  $\frac{4}{7}$  of 252. Of 406; 623; 945; 1806.
5. Find  $\frac{4}{5}$  of 315. Of 610; 845; 115; 530.

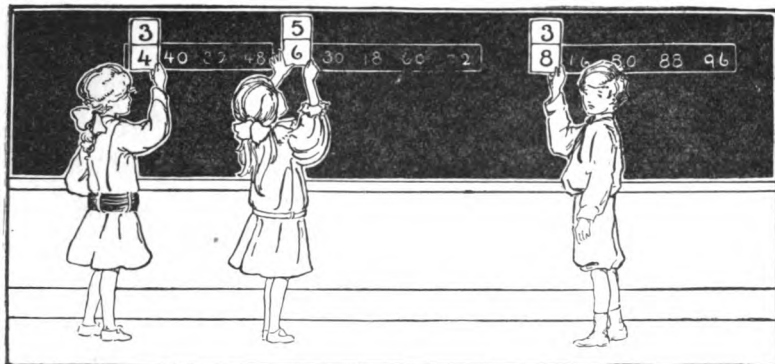
Find how much should be taken from the price of:

6. A chair marked \$3.60, selling at  $\frac{1}{3}$  off.
7. A rocker marked \$4.50, selling at  $\frac{2}{5}$  off.
8. A rug marked \$4.20, selling at  $\frac{1}{6}$  off.
9. A suit of clothes marked \$9.60, selling at  $\frac{3}{8}$  off.
10. A lawn swing marked \$7.20, selling at  $\frac{1}{4}$  off.
11. A doll's house marked \$8.50, selling at  $\frac{3}{5}$  off.
12. An engine and cars marked \$3.50, selling at  $\frac{1}{7}$  off.
13. A magic lantern marked \$5.92, selling at  $\frac{1}{8}$  off.

How much must be paid for:

14. A doll's carriage marked \$4.50, selling at  $\frac{1}{3}$  off?
15. A doll marked \$2.40, selling at  $\frac{1}{5}$  off?
16. A drum marked \$4.90, selling at  $\frac{2}{5}$  off?

## 46. Review Game



To play this game, products from different multiplication tables are written on a blackboard, as shown in the picture. Three children are each given a card upon which is written the part of each number that is to be taken. The children recite in turn, giving but one answer at a time and then slipping the card along to the next number. The game is to keep in the contest by answering in turn without hesitation. If a child is slow or makes a mistake, he loses his place to the child who corrects him.

To play this game, first study these tables:

- |    |                                                                       |
|----|-----------------------------------------------------------------------|
| 1. | Find $\frac{1}{3}$ , then $\frac{2}{3}$ , of: 9, 12, 18, 21, 27, 36.  |
| 2. | Find $\frac{1}{4}$ , then $\frac{3}{4}$ , of: 4, 8, 12, 24, 16, 20.   |
| 3. | Find $\frac{1}{5}$ , then $\frac{2}{5}$ , of: 10, 40, 15, 20, 25, 30. |
| 4. | Find $\frac{1}{6}$ , then $\frac{5}{6}$ , of: 12, 6, 18, 30, 24, 36.  |
| 5. | Find $\frac{1}{7}$ , then $\frac{4}{7}$ , of: 21, 14, 7, 28, 42, 35.  |
| 6. | Find $\frac{1}{8}$ , then $\frac{5}{8}$ , of: 8, 24, 16, 40, 32, 48.  |
| 7. | Find $\frac{2}{3}$ of: 24, 30, 33.                                    |
| 8. | Find $\frac{5}{6}$ of: 42, 54, 72.                                    |



## 47. Review and Test

## I

[With pencil.]

1.  $4,375 + 60,435 + 7,667 + 6,504 + 46,766 = ?$
2.  $\$6.75 + \$4.25 + \$38.50 + \$75.62 + \$45.34 + \$7.37 = ?$
3.  $8,463 - 4,258 = ?$
4.  $5,000 - 2,340 = ?$
5.  $\$80.00 - \$27.42 = ?$
6.  $7,645 \times 7 = ?$
7.  $\frac{2}{5}$  of 325 = ?
8.  $424 \times 23 = ?$
9.  $8,469 \div 7 = ?$
10.  $7,488 \div 24 = ?$

II <sup>1</sup>

[Without pencil.]

1. A strip of wood is 72 inches long. What is its length in feet?
2. A package weighs  $\frac{5}{8}$  of a pound. How much does it weigh in ounces?
3. A basket contains  $\frac{1}{2}$  of a bushel. How many pecks does it contain?

<sup>1</sup> A good method of giving a "mental" test is to have before each pupil a slip of paper upon which he first writes his name and then, in a column, figures for numbering the problems. The teacher reads a problem once, slowly and distinctly; and then, when the class has had sufficient time to solve the problem, the teacher says, "Write." The pupils write their answers and then look up, ready for the next problem. After the dictation of a number of problems in this way, papers are exchanged; and, as the teacher reads the correct answers, the pupils mark each problem C (correct) or X (wrong). Papers are returned to their owners, the problems are reviewed one at a time, and help is given the pupils who failed.

Before each test it will be found helpful to run through the types of problems included, asking pupils questions like these: How can you find the perimeter of a room? The number of inches in 3 feet? The number of quarts in 4 gallons? The cost of 2 lb. of butter when the cost of one is known? The amount due on a bill for a suit and a cap? The amount left from a ten-dollar bill after paying for groceries that come to less? The length of time to save \$5 at a given rate each week.

4. A clock that gives the time as 9:15 is 20 minutes fast. What is the correct time?
5. Frank leaves home at 8:35 and reaches school at 8:50. How many minutes is he on the way?
6. In Helen's pocket book there are 3 quarters and 2 dimes. How much money does it contain?
7. Notebooks are selling at 12¢ apiece, and pencils at 5¢. How much should be paid for 2 notebooks and 3 pencils?
8. How much should be paid for a box of paints at 25¢, 2 brushes at 5¢ each, and a sponge for 10¢?
9. A fish pole is to be bought for 35¢. How much change should be received from 50¢?
10. How much change should be received from a 50-cent piece in paying for 3 dishes of ice-cream at 10¢ a dish?
11. How much is left from a dollar after spending 25¢ for a hair-cut and 20¢ to have a pair of shoes mended?
12. Frank and Henry buy a baseball for 90¢, each paying one half the cost. How much is each boy's share of the expense?
13. Henry earns \$18 and spends  $\frac{5}{6}$  of it for a suit of clothes. How much does the suit cost?
14. Helen is saving money to buy a set of dishes costing 75¢. At the rate of 5¢ a day, how many days will it take her to save money enough to buy the dishes?
15. John is earning money with which to buy a bicycle costing \$40. At the rate of \$2 a week, how many weeks will it take him?

[With pencil.]

16. A camera is to be bought for \$3.50, a leather case for \$.95, and a roll of films for \$.25. How much money is needed?

17. Out of \$5.00 given her for a birthday present, Helen is to buy a croquet set for \$2.48. How much money will she have left?

18. How much money will Arthur have left if he earns \$10.00 and then spends out of his earnings \$6.25 for a football suit and \$2.75 for a football?

19. Ruth and her friends give a picnic. They buy 3 quarts of ice-cream at 40¢ a quart, 1 cake at 50¢, and 2 pounds of candy at 28¢ a pound. How much does the picnic cost?

20. The children in Mary's class at school buy for their library 24 new books at 75¢ apiece. How much money do the children spend?

21. A schoolroom is 24 feet wide and 28 feet long. What is its perimeter?

22. At the rate of \$1.25 apiece, how much does it cost to take 48 children on an excursion?

23. A farmer's land yields 32 bushels of corn to an acre. At this rate how many acres of land must a farmer plant to have a crop of 672 bushels of corn?

\*24. Forty acres of land are for sale for \$5,600. At the same rate how much must be paid for 24 acres?

\*25. A farmer has \$800 with which to buy live stock. He buys 2 horses at \$125 apiece, 3 cows at \$85 apiece, and 14 sheep at \$12.25 apiece. How much money has he left?

## 48. Test and Graded Practice

In this test are some of the important kinds of problems which you should be able to do at the end of the half year. If in the test you fail to get the correct answer to a problem, use for practice the exercise having the same letter.

## I. TEST

[With pencil.]

Add:

A. 5	B. 3	C. 543
7	4	645
4	7	247
6	6	675
5	5	<u>434</u>
—	7	
	6	
	—	

Find answers:

- D.  $1342 - 567 = ?$   
 E.  $2000 - 453 = ?$   
 F.  $546 \times 7 = ?$   
 G.  $254 \times 63 = ?$   
 H.  $1778 \div 7 = ?$   
 I.  $16,654 \div 61 = ?$   
 J.  $\frac{3}{4} \times 576 = ?$

## II. PRACTICE

A. Add. Time allowance, 1 minute for 9 problems.

4	4	2	3	7	4	3	5	7
6	7	5	6	2	4	2	3	4
3	5	7	6	4	7	6	6	7
5	4	4	4	7	6	6	4	3
4	3	4	5	5	2	7	4	5
—	—	—	—	—	—	—	—	—

B. Add. Time allowance,  $2\frac{1}{4}$  minutes for 9 problems.

5	6	2	4	6	1	2	5	7
7	5	7	3	3	4	7	2	5
4	4	3	4	6	5	7	7	6
6	3	7	6	5	7	4	0	7
5	7	4	5	4	0	3	3	0
3	6	6	7	3	6	6	7	7
4	2	5	4	2	7	6	5	4
—	—	—	—	—	—	—	—	—

C. Add and test. Time allowance, 6 minutes for 6 problems.

642	357	453	564	267	764
345	240	206	377	157	325
546	365	375	204	346	427
372	244	426	356	250	175
<u>543</u>	<u>325</u>	<u>323</u>	<u>447</u>	<u>325</u>	<u>463</u>

D. Subtract. Time allowance,  $1\frac{1}{4}$  minutes for 5 problems.

1536	1274	1464	1651	1342
<u>663</u>	<u>537</u>	<u>635</u>	<u>716</u>	<u>754</u>

E. Subtract. Time allowance,  $2\frac{3}{4}$  minutes for 10 problems.

1500	1700	1800	3000	4000
<u>622</u>	<u>542</u>	<u>654</u>	<u>473</u>	<u>634</u>
1200	1600	1500	2000	6000
<u>543</u>	<u>721</u>	<u>632</u>	<u>754</u>	<u>642</u>

F. Practice multiplying. Time allowance,  $1\frac{1}{4}$  minutes for 5 problems.

243	745	647	576	765
<u>4</u>	<u>3</u>	<u>5</u>	<u>6</u>	<u>7</u>

G. Multiply and test. Allow 13 minutes for 10 problems.

422	657	346	536	736
<u>23</u>	<u>41</u>	<u>72</u>	<u>45</u>	<u>27</u>
341	546	634	763	756
<u>32</u>	<u>51</u>	<u>34</u>	<u>42</u>	<u>72</u>

Find products and quotients. Time allowance for H, 5½ minutes; for I, 10 minutes; for J, 4 minutes. Test answers.

H. $1472 \div 2$ .	I. $19,282 \div 31$ .	J. $\frac{1}{3} \times 690 = ?$
$1854 \div 6$ .	$11,214 \div 21$ .	$\frac{2}{3} \times 420 = ?$
$3075 \div 5$ .	$13,144 \div 62$ .	$\frac{1}{8} \times 648 = ?$
$3464 \div 4$ .	$14,663 \div 43$ .	$\frac{3}{8} \times 448 = ?$
$1806 \div 7$ .	$21,996 \div 52$ .	$\frac{3}{4} \times 540 = ?$
$2765 \div 7$ .	$17,182 \div 71$ .	$\frac{3}{5} \times 750 = ?$
$3468 \div 6$ .	$19,968 \div 64$ .	$\frac{2}{7} \times 1680 = ?$

#### 49. Progress Score

There are tests or "examinations" by which you may measure your half year's work in arithmetic. Try to make 100 points on each of the four tests, counting for each correct answer the score given below the letter of the problem.

I. Add:

[With pencil.]

A. 24	B. 40	C. 27	D. 4	E. 32	F. 543
(4) <u>25</u>	(4) <u>36</u>	(5) <u>6</u>	(7) 2	(12) 50	(10) 236
			5	44	604
			7	56	264
G. 37	H. 436	I. \$12.46	6	37	676
(5) <u>45</u>	(7) 544	(9) 3.74	5	55	357
	<u>377</u>	<u>2.65</u>	<u>7</u>	<u>36</u>	

Write in columns and find answers:

J.  $4234 + 375 + 465 + 5234 + 374 = ?$   
(10)

K.  $\$3.75 + \$2.75 + \$4.64 + \$3.37 + \$2.16 = ?$   
(12)

L.  $\$2.50 + \$12.45 + \$1.46 + 75¢ + \$5.00 = ?$   
(15)

## II. Subtract:

$$\begin{array}{r} \text{A. } 78 \\ (3) \ 35 \\ \hline \end{array}$$

$$\begin{array}{r} \text{B. } 64 \\ (3) \ 30 \\ \hline \end{array}$$

$$\begin{array}{r} \text{C. } 53 \\ (5) \ 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{D. } 62 \\ (5) \ 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{E. } 543 \\ (5) \ 151 \\ \hline \end{array}$$

$$\begin{array}{r} \text{F. } 743 \\ (7) \ 275 \\ \hline \end{array}$$

$$\begin{array}{r} \text{G. } 3000 \\ (10) \ 1242 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H. } 1645 \\ (10) \ 750 \\ \hline \end{array}$$

$$\begin{array}{r} \text{I. } 5826 \\ (10) \ 2257 \\ \hline \end{array}$$

$$\begin{array}{r} \text{J. } \$5.00 \\ (10) \ .68 \\ \hline \end{array}$$

$$\begin{array}{r} \text{K. } \$16.54 \\ (10) \ 3.76 \\ \hline \end{array}$$

$$\begin{array}{r} \text{L. } \$7.50 \\ (10) \ 2.64 \\ \hline \end{array}$$

$$\begin{array}{r} \text{M. } \$40.00 \\ (12) \ 13.27 \\ \hline \end{array}$$

## III. Multiply:

$$\begin{array}{r} \text{A. } 24 \\ (3) \ 2 \\ \hline \end{array}$$

$$\begin{array}{r} \text{B. } 70 \\ (4) \ 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{C. } 65 \\ (4) \ 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{D. } 542 \\ (5) \ 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{E. } 406 \\ (5) \ 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{F. } \$2.76 \\ (5) \ 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{G. } \$.65 \\ (10) \ 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H. } \$4.60 \\ (5) \ 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{I. } 476 \\ (9) \ 90 \\ \hline \end{array}$$

$$\begin{array}{r} \text{J. } 213 \\ (10) \ 42 \\ \hline \end{array}$$

$$\begin{array}{r} \text{K. } 403 \\ (15) \ 76 \\ \hline \end{array}$$

$$\begin{array}{r} \text{L. } \frac{1}{2} \times 1740 = ? \\ (10) \end{array}$$

$$\begin{array}{r} \text{M. } \frac{3}{4} \times \$5.80 = ? \\ (15) \end{array}$$

## IV. Divide:

$$\begin{array}{r} \text{A. } 3 \overline{)69} \\ (3) \end{array}$$

$$\begin{array}{r} \text{B. } 4 \overline{)120} \\ (4) \end{array}$$

$$\begin{array}{r} \text{C. } 2 \overline{)52} \\ (5) \end{array}$$

$$\begin{array}{r} \text{D. } 5 \overline{)175} \\ (5) \end{array}$$

$$\begin{array}{r} \text{E. } 6 \overline{)618} \\ (7) \end{array}$$

$$\begin{array}{r} \text{F. } 4 \overline{)121} \\ (7) \end{array}$$

$$\begin{array}{r} \text{G. } 7 \overline{)1795} \\ (8) \end{array}$$

$$\begin{array}{r} \text{H. } 6 \overline{)57283} \\ (12) \end{array}$$

$$\begin{array}{r} \text{I. } 5 \overline{)\$7.25} \\ (9) \end{array}$$

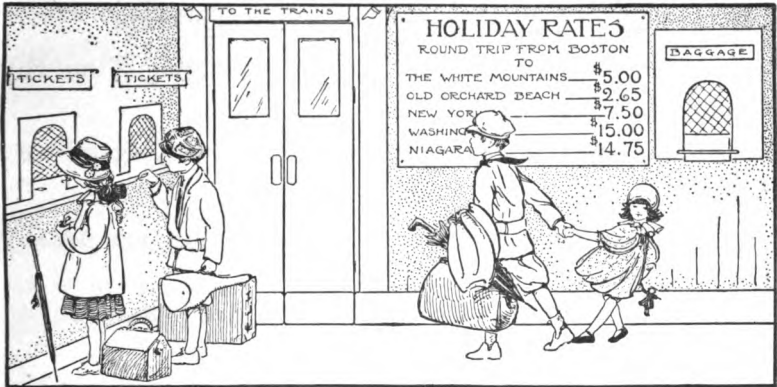
$$\begin{array}{r} \text{J. } 3 \overline{)\$18.12} \\ (10) \end{array}$$

$$\begin{array}{r} \text{K. } 21 \overline{)903} \\ (15) \end{array}$$

$$\begin{array}{r} \text{L. } 63 \overline{)20412} \\ (15) \end{array}$$

## CHAPTER V. TRAVEL

### 50. At a Railway Ticket Office



[Without pencil.]

1. John and Mary are going on a visit. The railway tickets cost 60¢ apiece. In buying his ticket John gives the agent a dollar bill. How much change should John receive?

2. In buying her ticket, Mary gives the agent 3 quarters. How much change is due her?

3. Find the cost of the two tickets.

How much should be paid:

4. For 2 tickets at 20¢ each?

5. For 3 tickets at 25¢ each?

6. For 1 ticket for 30¢ and 1 for 20¢?

7. For 2 tickets at 15¢ and 1 for 10¢?



Find how much change should be received:

8. From a 25-cent piece in buying a ticket for 18¢.
9. From a 50-cent piece in buying a ticket for 35¢.
10. From a 50-cent piece in buying 2 tickets at 20¢ each.
11. From a dollar in buying a ticket for 85¢.
12. From a dollar in buying 3 tickets at 25¢ each.
13. Make and solve a problem about buying 2 railway tickets at 25¢ apiece.
14. Make and solve other problems about buying railway tickets.
15. Children between six and twelve years of age usually ride on steam cars and boats for half fare.  
The full fare between Chicago and Niagara Falls is \$18.50. How much must be paid for a half-fare ticket?
16. Find how much must be paid for a half-fare ticket between St. Louis and New York with the full fare at \$32.00.  
[With pencil.]
17. Fourteen boys are going on an excursion. At \$3.75 apiece, how much will the tickets for the entire party cost?
18. Two tickets are to be bought. One is to cost \$4.75 and the other, \$3.98. How much must be paid for the two?
19. How much change from \$10.00 should be received in buying a ticket for \$4.98?
20. Helen and her two sisters are to visit their grandmother. The railway fare is \$4.20. How much must be paid for half-fare tickets for the three girls?
- \* 21. Fred and his two cousins are to go on a fishing trip

with Fred's father. The full fare for the railway ticket is \$7.40. Find the cost of 1 full-fare and 3 half-fare tickets:

\*22. Plan a schoolroom ticket office. First find out the railway fare to neighboring towns and to places of interest at a distance, and write the rates on the blackboard; then make tickets of slips of paper and cardboard, choose an agent, and buy tickets for imaginary trips.

### 51. Time in Travel

#### I

[Without pencil.]

1. Beginning at 8 o'clock in the morning, a car going toward Robert's school passes his home every 10 minutes. At what times between eight and nine o'clock can Robert take a car for school?

Give an hour's schedule:

2. Beginning at 7 o'clock for a car passing every 5 minutes.
3. Beginning at 8 o'clock for a car passing every 15 minutes.
4. Beginning at 9 o'clock for a car passing every 6 minutes.
5. Beginning at 10 o'clock for a car passing every 12 minutes.
6. Beginning at 1:03 for a car passing every 10 minutes.
7. Beginning at 5:07 for a car passing every 20 minutes.
8. It takes a man 20 minutes to walk from his home to a railway station. At what time must he leave home to catch a 10:30 train?
9. A train takes a half-hour to travel between a village and

a city. If it leaves the village at 8:15, at what time will it reach the city?

10. A boat takes three quarters of an hour to cross a lake. At what time will it finish its trip across, if it starts at 4:10? If it starts at 4:45?

11. Make a problem about a train due in 20 minutes.

12. Make a problem about a train leaving a village at 8:15 in the morning and reaching another village a given number of minutes later.

13. One morning in winter the trains were delayed by a storm. The blackboard in the railway station contained the record given below. Find at what time each train would reach the station if there were no further delays.

#### TRAIN BULLETIN

Train No. 5 due at 8:02, 15 minutes late.

Train No. 12 due at 10:45,  $\frac{1}{2}$  hour late.

Train No. 7 due at 11:15,  $\frac{3}{4}$  hour late.

Train No. 19 due at 11:55, 35 minutes late.

## II

[Without pencil.]

1. How long is a journey that lasts from 11 o'clock in the morning until 4 o'clock in the afternoon?

11 o'clock in the morning is often written 11 A.M.; and 4 o'clock in the afternoon, 4 P.M.

A.M.<sup>1</sup> means before noon. P.M.<sup>2</sup> means after noon.

<sup>1</sup> A.M. is an abbreviation for *ante meridiem* (*ante*=before; *meridiem*=noon).

<sup>2</sup> P.M. is an abbreviation for *post meridiem* (*post*=after; *meridiem*=noon).

Find how many hours there are between:

- |                       |                            |
|-----------------------|----------------------------|
| 2. 11 A.M. and 5 P.M. | 6. 9:30 A.M. and 12 noon.  |
| 3. 11 A.M. and 8 P.M. | 7. 9:30 A.M. and 4 P.M.    |
| 4. 8 A.M. and 4 P.M.  | 8. 7:30 A.M. and 3 P.M.    |
| 5. 6 A.M. and 3 P.M.  | 9. 7:30 A.M. and 2:30 P.M. |

Find the time taken:

10. By a train leaving New York at 5 P.M. and reaching Boston the same day at 10 P.M.

11. By a train leaving New York at 11 A.M. and reaching Washington the same day at 4:20 P.M.

\*12. The clocks in Chicago are kept 1 hour behind the New York clocks. Find the time taken by a train leaving New York at 4 P.M. by the New York clocks and reaching Chicago the next morning at 9 A.M. by the Chicago clocks.

## 52. The Use of Large Numbers

1. What is the longest distance of which you have ever heard?

The moon is many thousands of miles away. The sun is so far away that if you could travel to it in a train at the rate of a mile a minute, night and day, it would take you over 176 years to reach it. Some of the stars that look like dots in the sky are thousands of times as far away as the sun.

To express long distance, great size, or great length of time, numbers larger than thousands are needed. After thousands come millions.<sup>1</sup>

<sup>1</sup> To get an idea of how many a million is, the children in a class started counting. They found that by counting 50 a minute, it would take them 13 days, 21 hours to count to a million.

Millions	Thousands	Units
243,	147,	214

2. Which period is units' period? Which is thousands'? Which is millions'?

3. How many figures are there in each period? What mark of punctuation separates them?

The figures in each period are read as if they stood alone, and then the period in which they are placed is named. For example, 541 is read five hundred forty-one, no matter in what period it is placed. It may be 541 units, 541 thousands, or 541 millions.

324 is read three hundred twenty-four.

324,000 is read three hundred twenty-four thousand.

324,000,000 is read three hundred twenty-four million.

324,324,324 is read three hundred twenty-four million, three hundred twenty-four thousand, three hundred twenty-four.

Avoid using the word *and* in reading numbers.

Read:

4.	5.	6.
675	420,060	342,247
2,367	1,000,000	20,074
25,975	85,704	675,218
84,266	906,800	8,905
165,988	5,020	118,592
20,000	30,750	860,600
300,000	700,025	243,050

**Write figures:**

- |                  |                          |
|------------------|--------------------------|
| 7. One thousand. | 9. One hundred thousand. |
| 8. Ten thousand. | 10. One million.         |
11. One thousand, seven hundred twelve.
  12. One thousand, twelve.
  13. Three thousand, eleven.
  14. Ten thousand, two hundred twenty.
  15. Ten thousand, twenty.
  16. Ten thousand, thirty.
  17. One hundred forty thousand.
  18. Two hundred thirty thousand.
  19. Two hundred thirty thousand, five hundred sixty.
  20. Two hundred thirty thousand, sixty.
  21. Three hundred fifty thousand, four hundred twelve.

### 53. Roman Numbers

1. Review the exercises on page 164.
2. Learn:

CC=200	D=500	DCCC=800
CCC=300	DC=600	CM=900
CD=400	DCC=700	M=1000

**Read:**

- |        |         |         |       |
|--------|---------|---------|-------|
| 3. CCX | 4. DCCL | 5. CDL  | 6. MD |
| CCCXX  | DCCLV   | CDLV    | CM    |
| CDXXX  | DCLVII  | CDLVIII | CML   |

7. Be ready to write numbers like those above as your teacher dictates them to you.

**54. Review and Practice with the Number Eight**

[Without pencil.]

**1. Practice adding and then subtracting:**

10	11	13	14	18	17	16	12	15	19
<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>

**2. Count from 8 to 96 by 8. 3. Count by 8's into the forties starting in turn with 1, 2, 3, 4, 5, 6, and 7.**

[Write answers on the folds of a paper.]

**Practice until you can add these columns at a steady rate.**

4.	4	8	5	4	8
	8	4	8	8	5
	<u>5</u>	<u>3</u>	<u>6</u>	<u>3</u>	<u>4</u>
5.	6	7	8	5	8
	8	8	6	8	6
	3	2	8	5	6
	8	8	3	8	8
	<u>4</u>	<u>8</u>	<u>2</u>	<u>3</u>	<u>7</u>

6.	3	5	4	2	4
	8	6	8	5	8
	6	4	7	8	3
	5	8	8	0	3
	3	5	7	6	4
	2	5	8	8	8
	8	8	0	4	8
	<u>7</u>	<u>5</u>	<u>9</u>	<u>5</u>	<u>6</u>

**Practice adding. Work rapidly, but carefully.<sup>1</sup>**

7. 2814	8. 1435	9. 5732	10. 3247	11. 4578
1283	3288	4858	4881	8684
3848	1803	3415	5238	2808
5284	5218	2588	8580	1235
<u>3243</u>	<u>4125</u>	<u>1336</u>	<u>1347</u>	<u>2354</u>

**Practice subtracting, naming differences only.<sup>1</sup>**

12. 933	13. 1312	14. 1654	15. 4000	16. 9625
<u>488</u>	<u>808</u>	<u>878</u>	<u>847</u>	<u>688</u>

<sup>1</sup> To time pupils on these exercises, teachers may use as a standard  $6\frac{1}{4}$  minutes for 5 problems for problems 7-11, and  $1\frac{1}{4}$  minutes for problems 12-16.

[Use pencil only when needed.]

1. Practice multiplying 8 by: 9; 6; 4; 3; 8; 2; 5; 7; 11; 12.

Find products:

2. $\begin{array}{r} 84 \\ 2 \end{array}$	3. $\begin{array}{r} 81 \\ 5 \end{array}$	4. $\begin{array}{r} 80 \\ 7 \end{array}$	5. $\begin{array}{r} 83 \\ 3 \end{array}$	6. $\begin{array}{r} 81 \\ 6 \end{array}$	7. $\begin{array}{r} 82 \\ 4 \end{array}$	8. $\begin{array}{r} 80 \\ 9 \end{array}$	9. $\begin{array}{r} 81 \\ 8 \end{array}$
-------------------------------------------	-------------------------------------------	-------------------------------------------	-------------------------------------------	-------------------------------------------	-------------------------------------------	-------------------------------------------	-------------------------------------------

10. Practice dividing the numbers in each column by 8:

16	24	32	40	56	64	72	80
19	27	35	45	57	60	75	88
18	29	37	48	59	68	78	96

[Write answers on the folds of a paper.]

Multiply, naming the figures in the product only.<sup>1</sup>

11. $\begin{array}{r} 183 \\ 4 \end{array}$	12. $\begin{array}{r} 508 \\ 7 \end{array}$	13. $\begin{array}{r} 418 \\ 6 \end{array}$	14. $\begin{array}{r} 825 \\ 5 \end{array}$	15. $\begin{array}{r} 380 \\ 9 \end{array}$
---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------

16. $\begin{array}{r} 581 \\ 8 \end{array}$	17. $\begin{array}{r} 288 \\ 3 \end{array}$	18. $\begin{array}{r} 878 \\ 2 \end{array}$	19. $\begin{array}{r} 708 \\ 9 \end{array}$	20. $\begin{array}{r} 186 \\ 7 \end{array}$
---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------

21. $\begin{array}{r} 428 \\ 6 \end{array}$	22. $\begin{array}{r} 608 \\ 8 \end{array}$	23. $\begin{array}{r} 581 \\ 9 \end{array}$	24. $\begin{array}{r} 786 \\ 5 \end{array}$	25. $\begin{array}{r} 678 \\ 7 \end{array}$
---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------

26. $\begin{array}{r} 385 \\ 4 \end{array}$	27. $\begin{array}{r} 278 \\ 8 \end{array}$	28. $\begin{array}{r} 428 \\ 9 \end{array}$	29. $\begin{array}{r} 863 \\ 7 \end{array}$	30. $\begin{array}{r} 788 \\ 6 \end{array}$
---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------	---------------------------------------------

Divide, naming figures in the quotient only.<sup>1</sup>

31. $8 \overline{)1680}$	32. $8 \overline{)2594}$	33. $8 \overline{)5176}$	34. $8 \overline{)6516}$
--------------------------	--------------------------	--------------------------	--------------------------

35. $8 \overline{)7440}$	36. $8 \overline{)5736}$	37. $8 \overline{)8992}$	38. $8 \overline{)4720}$
--------------------------	--------------------------	--------------------------	--------------------------

39. $8 \overline{)6272}$	40. $8 \overline{)3920}$	41. $8 \overline{)3184}$	42. $8 \overline{)9880}$
--------------------------	--------------------------	--------------------------	--------------------------

<sup>1</sup> For timing problems 11-30, allow  $2\frac{1}{2}$  minutes for 10 problems; for problems 31-42, allow 2 minutes for 5 problems.



55. Sight work with Two Figures <sup>1</sup>

## I

Find answers:

[Without pencil.]

1.  $44 + 14 = ?$  2.  $80 - 40 = ?$  3.  $40 \times 2 = ?$  4.  $60 \div 20 = ?$

$32 + 15 = ?$   $50 - 30 = ?$   $30 \times 3 = ?$   $80 \div 40 = ?$

$26 + 13 = ?$   $88 - 44 = ?$   $22 \times 4 = ?$   $90 \div 30 = ?$

Add:

5.  $\begin{array}{r} 32 \\ 24 \\ \hline \end{array}$  6.  $\begin{array}{r} 14 \\ 32 \\ \hline \end{array}$  7.  $\begin{array}{r} 13 \\ 24 \\ \hline \end{array}$  8.  $\begin{array}{r} 15 \\ 42 \\ \hline \end{array}$  9.  $\begin{array}{r} 17 \\ 32 \\ \hline \end{array}$  10.  $\begin{array}{r} 24 \\ 32 \\ \hline \end{array}$  11.  $\begin{array}{r} 54 \\ 45 \\ \hline \end{array}$

12.  $\begin{array}{r} 25 \\ 25 \\ \hline \end{array}$  13.  $\begin{array}{r} 16 \\ 16 \\ \hline \end{array}$  14.  $\begin{array}{r} 17 \\ 17 \\ \hline \end{array}$  15.  $\begin{array}{r} 18 \\ 18 \\ \hline \end{array}$  16.  $\begin{array}{r} 19 \\ 19 \\ \hline \end{array}$  17.  $\begin{array}{r} 16 \\ 24 \\ \hline \end{array}$  18.  $\begin{array}{r} 14 \\ 38 \\ \hline \end{array}$

Subtract:

19.  $\begin{array}{r} 72 \\ 20 \\ \hline \end{array}$  20.  $\begin{array}{r} 64 \\ 14 \\ \hline \end{array}$  21.  $\begin{array}{r} 90 \\ 40 \\ \hline \end{array}$  22.  $\begin{array}{r} 75 \\ 25 \\ \hline \end{array}$  23.  $\begin{array}{r} 89 \\ 45 \\ \hline \end{array}$  24.  $\begin{array}{r} 78 \\ 35 \\ \hline \end{array}$  25.  $\begin{array}{r} 97 \\ 44 \\ \hline \end{array}$

26.  $\begin{array}{r} 40 \\ 25 \\ \hline \end{array}$  27.  $\begin{array}{r} 30 \\ 12 \\ \hline \end{array}$  28.  $\begin{array}{r} 70 \\ 35 \\ \hline \end{array}$  29.  $\begin{array}{r} 60 \\ 45 \\ \hline \end{array}$  30.  $\begin{array}{r} 72 \\ 36 \\ \hline \end{array}$  31.  $\begin{array}{r} 56 \\ 28 \\ \hline \end{array}$  32.  $\begin{array}{r} 72 \\ 24 \\ \hline \end{array}$

Multiply:

33.  $\begin{array}{r} 20 \\ 3 \\ \hline \end{array}$  34.  $\begin{array}{r} 30 \\ 2 \\ \hline \end{array}$  35.  $\begin{array}{r} 50 \\ 2 \\ \hline \end{array}$  36.  $\begin{array}{r} 40 \\ 3 \\ \hline \end{array}$  37.  $\begin{array}{r} 50 \\ 4 \\ \hline \end{array}$  38.  $\begin{array}{r} 21 \\ 4 \\ \hline \end{array}$

Divide:

39.  $20 \overline{)80}$  40.  $30 \overline{)90}$  41.  $21 \overline{)42}$  42.  $33 \overline{)99}$

43.  $21 \overline{)84}$  44.  $22 \overline{)66}$  45.  $32 \overline{)96}$  46.  $25 \overline{)75}$

<sup>1</sup> For practice work, teachers will find it convenient to make sets of "flash cards" by pasting figures from large-sized calendars on cards 4 in. by 8 in.

## II

In adding without a pencil, it is sometimes convenient to work in the following way:

To add 15 to 22, add 10 and then 5.

To add 24 to 43, add 20 and then 4.

Find sums, using the method given above: [Without pencil.]

$$1. 24 + 14 = ? \quad 5. 53 + 22 = ? \quad 9. 42 + 15 = ?$$

$$2. 23 + 12 = ? \quad 6. 76 + 23 = ? \quad 10. 54 + 33 = ?$$

$$3. 43 + 15 = ? \quad 7. 45 + 31 = ? \quad 11. 24 + 35 = ?$$

$$4. 62 + 13 = ? \quad 8. 62 + 27 = ? \quad 12. 44 + 45 = ?$$

### 56. Three Figures in a Multiplier

Allowing 152 barrels to a car, how many barrels of apples can be carried in 123 freight cars?

152 multiplied by 123 equals what?

Think:

$$\begin{array}{r} 152 \\ 123 \\ \hline 456 \\ 3040 \\ 15200 \\ \hline 18696 \end{array}$$

Since 123 equals 3 units, 2 tens, and 1 hundred, to multiply by 123 is the same as to multiply by 3, by 20, and by 100, and then to find the sum of the three products.

$$3 \times 152 = 456.$$

$$20 \times 152 = 3,040.$$

$$100 \times 152 = 15,200.$$

The sum of the products equals 18,696.

Write:

$$\begin{array}{r} 152 \\ 123 \\ \hline 456 \\ 304 \\ 152 \\ \hline 18696 \end{array}$$

For convenience, the one cipher in the second product and the two ciphers in the third product are omitted; but places are left for them, so that, in adding, tens will fall under tens, hundreds under hundreds, and so on.

[With pencil.]

1. Multiply 214 by 212; 312 by 121; 142 by 211; 322 by 213.
2. At the rate of 412 passengers a day, how many passengers can a ferryboat carry in a year of 365 days?
3. If the expense for each child is \$1.15, how much does it cost to take 112 city children into the country for a picnic?
4. A railway engineer earns \$8.50 a day. How much are his wages for 212 days?
5. Multiply by 213: 243; 521; 234; 546; 378.
6. Multiply by 232: 342; 453; 267; 348; 932.
7. Multiply by 425: 453; 278; 963; 849; 798.
8. Multiply by 326: 783; 264; 389; 978; 869.

### 57. A Cipher within a Multiplier

What is the product of 428 and 203?

Think:

$$\begin{array}{r}
 428 \\
 203 \\
 \hline
 1284 \\
 85600 \\
 \hline
 86884
 \end{array}$$

Since 203 equals 3 units and 2 hundreds, to multiply by 203 is the same as to multiply first by 3 and then by 200 and then to find the sum of the products.

3 times 428 = 1,284.

200 times 428 = 85,600.

The sum of the products = 86,884.

Write:

$$\begin{array}{r}
 428 \\
 203 \\
 \hline
 1284 \\
 856 \\
 \hline
 86884
 \end{array}$$

When a cipher occurs between two figures in a multiplier, as shown here, the second product is moved one place farther to the left, so that hundreds fall under hundreds and thousands under thousands.

[With pencil.]

1. Multiply 342 by 102; 412 by 203; 122 by 201; 342 by 302.
2. A machine weighs 112 pounds. What is the weight of 104 such machines?
3. Allowing 5,280 feet of telephone wire to a mile, how many feet of wire does it take to extend 203 miles?
4. A freight car holds 760 bushels of grain. How many bushels of grain can be carried in 105 such cars?
5. Multiply by 102: 322; 213; 1,324; 2,431; 3,204.
6. Multiply by 203: 142; 233; 1,221; 2,422; 2,443.
7. Multiply by 404: 312; 218; 711; 804; 1,342.
8. Multiply by 506: 241; 320; 808; 2,432; 4,675.
9. Multiply by 607: 824; 916; 307; 4,124; 5,764.
10. Multiply by 705: 321; 234; 679; 2,135; 6,459.
11. Add 764, 575, and 754. Multiply the sum by 407.

### 58. Practice in Long Division

[With pencil.]

1. A warship covers 462 miles in 21 hours. How can its rate of speed per hour be found? What is the rate?

Find the rate of speed per hour:

2. For a fast ocean steamship covering 480 miles in 20 hours.
3. For an airship covering 588 miles in 14 hours.
4. For an automobile covering 221 miles in 13 hours.
5. For a fast express covering 1,488 miles in 24 hours.

Divide:

- |                   |                   |                   |
|-------------------|-------------------|-------------------|
| 6. 651 by 21.     | 11. 308 by 14.    | 16. 5,313 by 23.  |
| 7. 6,603 by 31.   | 12. 967 by 30.    | 17. 1,176 by 42.  |
| 8. 918 by 34.     | 13. 4,473 by 21.  | 18. 1,900 by 51.  |
| 9. 13,161 by 41.  | 14. 2,665 by 22.  | 19. 4,000 by 33.  |
| 10. 13,275 by 25. | 15. 58,025 by 25. | 20. 55,464 by 24. |

## 59. Further Help in Long Division

## I

$$70,224 \div 231 = ?$$

$$\begin{array}{r}
 304 \\
 231 \overline{) 70224} \\
 \underline{693} \phantom{00} \\
 924 \\
 \underline{924} \\
 0
 \end{array}$$

In long division care must be taken to place the first figure in the quotient over the last figure of that part of the dividend used for the first division; and, after that, to place one figure in the quotient for each of the remaining figures in the dividend.

When the new dividend formed is too small to contain the divisor, 0 is written in the quotient, and another figure added to the new dividend. In dividing 70,224 by 231, the new dividend 92 was less than the divisor 231. A cipher (0) was written in the quotient above the 2, and the figure 4 was written with the 92 forming the new dividend 924.

[With pencil.]

1. Divide 8,692 by 212; 9,960 by 332; 4,600 by 23; 2,660 by 133; 2,222 by 22.

2. Find how many hours there are in 1,440 minutes. In 4,320 minutes.

3. A steamship takes 384 hours to cross the Pacific. How many days is it on its voyage?

4. A man on a motor-cycle covers a distance of 336 miles in 14 hours. What is his rate of travel per hour?

Divide:

- |                 |                   |                     |
|-----------------|-------------------|---------------------|
| 5. 6,231 by 31. | 10. 6,640 by 332. | 15. 2,785 by 121.   |
| 6. 9,933 by 33. | 11. 2,806 by 122. | 16. 69,510 by 331.  |
| 7. 9,664 by 32. | 12. 2,660 by 133. | 17. 130,088 by 322. |
| 8. 9,331 by 31. | 13. 7,752 by 323. | 18. 97,030 by 313.  |
| 9. 6,300 by 21. | 14. 6,882 by 222. | 19. 99,910 by 321.  |

## II

A fruit farm of 38 acres is bought for \$10,450. This is how much an acre?

$$\$10,450 \div 38 = ?$$

$$\begin{array}{r} 275 \\ 38 \overline{)10450} \\ \underline{76} \phantom{0} \\ 285 \phantom{0} \\ \underline{266} \phantom{0} \\ 190 \phantom{0} \\ \underline{190} \phantom{0} \end{array}$$

In this problem, since the divisor 38 is so near 40 in value, in finding the figures in the quotient, 4 is used as a guide in place of the 3.

Since 4 is contained in 10 twice, 2 is written for the first figure in the quotient and 38 multiplied by it.

How was the figure 7 in the quotient found?

Cost of 1 acre = \$275.

1. What figure should be used as a guide in dividing a number by 49? By 68? By 58? By 77? By 375? By 184?

Name for each problem the figure to be used as a guide:

- |                           |                           |                            |
|---------------------------|---------------------------|----------------------------|
| 2. $38 \overline{)9652}$  | 6. $67 \overline{)30351}$ | 10. $58 \overline{)26274}$ |
| 3. $57 \overline{)36024}$ | 7. $28 \overline{)21700}$ | 11. $37 \overline{)16058}$ |
| 4. $48 \overline{)26112}$ | 8. $47 \overline{)30315}$ | 12. $57 \overline{)31122}$ |
| 5. $39 \overline{)12519}$ | 9. $48 \overline{)4080}$  | 13. $76 \overline{)49020}$ |

14. Find the quotients for the problems above (with pencil).

## III

It cost a dealer \$27.20 to send 32 barrels of apples by freight. This was how much a barrel?

$$\$27.20 \div 32 = ?$$

$$\begin{array}{r} \$0.85 \\ 32 \overline{) \$27.20} \\ \underline{256} \phantom{0} \\ 160 \\ \underline{160} \phantom{0} \\ 0 \end{array}$$

In dividing United States money by a whole number, the decimal point in the quotient is placed directly above the one in the dividend.

\$0.85 = cost per barrel.

Divide:

[With pencil.]

1. \$44.40 by 24.    5. \$83.20 by 40.    9. \$28.32 by 354.

2. \$16.45 by 35.    6. \$19.68 by 123.    10. \$388.48 by 64.

3. \$40.46 by 17.    7. \$127.10 by 205.    11. \$41.30 by 70.

4. \$13.34 by 46.    8. \$228.96 by 72.    12. \$28.86 by 78.

13. A railway company charged \$62.75 to carry 25 people to a picnic ground. This was how much for each person?

14. It cost \$180.00 to repair 75 feet of railway track. How much was that a foot?

\*15. A freight train of 28 cars carried goods that were worth \$89,810. How much was that a car?

IV<sup>1</sup>

Practice on each set of problems in which you make mistakes until you can get the correct quotients quickly.

<sup>1</sup> Exercises A, B, C, D contain the simplest types of long division problems, with and without zeros in the quotient. Exercises E, F, and G repeat the same simple types with three-figure divisors. In Exercises H and I the true figures in the quotient are found by increasing the guide figure by one. J contains United States money. In K and L the guide figures are misleading.

[With pencil.]

A.

1.  $672 \div 21$ .

2.  $759 \div 33$ .

3.  $286 \div 22$ .

4.  $882 \div 42$ .

5.  $994 \div 71$ .

6.  $1464 \div 61$ .

7.  $1376 \div 43$ .

8.  $2304 \div 72$ .

9.  $1643 \div 53$ .

10.  $1344 \div 64$ .

B.

11.  $9471 \div 21$ .

12.  $7128 \div 22$ .

13.  $7254 \div 31$ .

14.  $5166 \div 42$ .

15.  $4928 \div 44$ .

16.  $24,236 \div 73$ .

17.  $16,692 \div 52$ .

18.  $19,032 \div 61$ .

19.  $14,144 \div 64$ .

20.  $29,323 \div 71$ .

C.

21.  $3841 \div 32$ .

22.  $13,120 \div 41$ .

23.  $29,615 \div 63$ .

24.  $31,081 \div 42$ .

25.  $31,397 \div 73$ .

D.

26.  $14,413 \div 71$ .

27.  $24,862 \div 62$ .

28.  $20,582 \div 41$ .

29.  $31,408 \div 52$ .

30.  $28,928 \div 32$ .

E.

31.  $6741 \div 321$ .

32.  $3813 \div 123$ .

33.  $9702 \div 231$ .

34.  $3503 \div 113$ .

35.  $3564 \div 162$ .

36.  $14,348 \div 422$ .

37.  $31,293 \div 513$ .

38.  $27,176 \div 632$ .

39.  $17,556 \div 532$ .

40.  $16,376 \div 712$ .

F.

41.  $71,280 \div 324$ .

42.  $72,230 \div 233$ .

43.  $136,320 \div 426$ .

44.  $112,140 \div 534$ .

G.

45.  $161,784 \div 321$ .

46.  $299,026 \div 742$ .

47.  $316,762 \div 631$ .

48.  $449,580 \div 635$ .

49.  $235,312 \div 764$ .

H.

50.  $1634 \div 38$ .

51.  $36,018 \div 58$ .

52.  $31,114 \div 47$ .

53.  $9548 \div 28$ .

54.  $25,228 \div 68$ .

55.  $16,724 \div 37$ .

56.  $55,941 \div 87$ .

57.  $31,416 \div 68$ .

58.  $21,736 \div 76$ .

59.  $31,464 \div 57$ .

I.

60.  $12,880 \div 28$ .

61.  $30,240 \div 56$ .

62.  $13,320 \div 37$ .

63.  $31,200 \div 48$ .

64.  $26,680 \div 58$ .

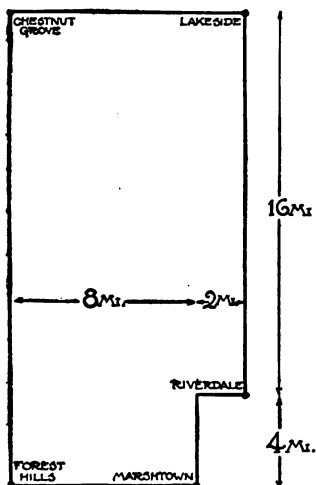
J.

65.  $\$66.34 \div 31$ .



66. \$224.64 ÷ 52.	K.	L.
67. \$156.45 ÷ 21.	*75. 86,400 ÷ 27.	*83. 24,639 ÷ 43.
68. \$328.60 ÷ 62.	*76. 37,350 ÷ 45.	*84. 15,552 ÷ 32.
69. \$265.22 ÷ 42.	*77. 36,168 ÷ 66.	*85. 37,056 ÷ 64.
70. \$13.25 ÷ 53.	*78. 40,320 ÷ 56.	*86. 22,125 ÷ 75.
71. \$10.08 ÷ 24.	*79. 42,104 ÷ 76.	*87. 64,206 ÷ 82.
72. \$21.35 ÷ 61.	*80. 56,865 ÷ 85.	*88. 20,592 ÷ 572.
73. \$91.80 ÷ 45.	*81. 19,152 ÷ 36.	*89. 18,432 ÷ 384.
74. \$510.72 ÷ 84.	*82. 28,350 ÷ 45.	*90. 26,854 ÷ 463.

### 60. Travel by Trolley



[Use pencil for drawings only.]

1. This is a map of a trolley line connecting five villages. Find with the help of the map the shortest distance from Forest Hills to Chestnut Grove.

2. What is the distance from Chestnut Grove to Lakeside? From Lakeside to Marshtown? From Riverdale to Forest Hills?

3. Name other distances on the line.

4. What is the entire distance around the line? What is  $\frac{1}{2}$  the distance around the line?

5. A car line encloses a rectangle of land 4 miles wide and 8 miles long. What is its entire length? (Make a drawing.)

6. What is the length of a street-car line in the shape of a triangle 5 miles on one side, 9 miles on another side, and 6 miles on the third side? (Make a drawing.)

7. How much longer is a car line in the shape of a rectangle 3 miles wide and 4 miles long than one in the shape of a triangle 4 miles on a side? (Make drawings.)

8. Allowing 7 minutes for each trip, how many trips can a car make in 35 minutes? In an hour?

9. A car passes a railway station every 12 minutes, beginning at 3 minutes past the hour. What is its time schedule between nine o'clock and ten?

[With pencil.]

10. Play that you are a street-car conductor and that you make five trips a day. Find how many passengers ride with you in a day when, on the first trip, you have 84 passengers; on the second trip, 124 passengers; on the third trip, 98 passengers; on the fourth, 107 passengers; and on the fifth, 164 passengers.

11. Each cash fare is 5¢. How many passengers have paid you cash fares by the time you receive \$4.75?

12. How much money should you receive from 75 passengers when all but 14 pay cash fares?

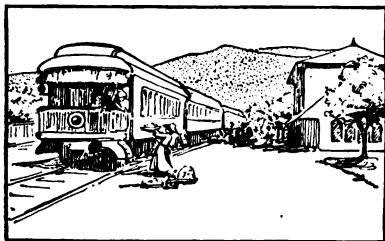
13. A motorman receives \$4.75 a day for his work. How much are his wages for a month when he works 26 days?

\*14. A railway engineer receives \$120.75 for working 21 days; a motorman on a trolley receives \$78.75 for the same time. How much more is received a day by the railway engineer than by the motorman?

**61. Railway Journeys**

[With pencil.]

1. How many miles long is a trip across our country from ocean to ocean, made with one change of trains, when the first train covers a distance of 1,022 miles, and the second train a distance of 2,278 miles?



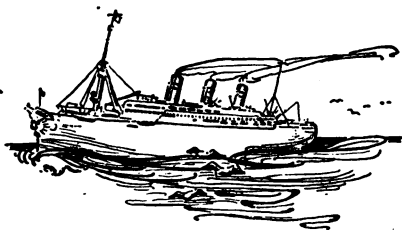
2. Traveling at the rate of 33 miles an hour, how many hours does it take to make the trip named in the problem above? How many days and hours does it take?
3. The railway distance from the northern boundary of our country, down the Mississippi valley to New Orleans is 1,705 miles. How much less than 2,000 miles is the distance?
4. It takes a train 5 hours, traveling at the rate of 45 miles an hour, to go from New York to Washington. How far apart are the two cities?
5. Find the distance covered by a train traveling from New York to New Orleans. Time required, 42 hours. Rate of speed, 32 miles an hour.
6. Find the cost of a trip from Chicago to Niagara Falls for a mother and her ten-year-old daughter, who pays half fare. Allow \$18.50 for the full fare and \$7.75 for their other traveling expenses.
7. After paying the expenses of the trip, how much money is left from \$50?

\*8. Find the cost of a trip across our country from Boston to San Francisco for a ten-year-old boy (half fare) and his father. Allow \$110.70 for the full fare, \$18.50 for one berth in the sleeping-car for the two, and \$25.00 for their other expenses.

## 62. Crossing the Ocean

[With pencil.]

1. In crossing the Atlantic Ocean a fast steamer traveled on the first day 558 miles; on the second day, 655 miles; on the third day, 692 miles; on the fourth day, 696 miles; and on the fifth day, 595 miles. What was the distance covered?



2. How much longer is a route across the Atlantic 3,196 miles long than one 3,071 miles long?

3. What is the rate of travel per day made by a steamer crossing in 5 days by the route 3,196 miles long?

4. What is the distance covered by a steamer in 24 hours, traveling at the rate of 22 miles an hour?

5. A steamer crossed the ocean 24 times in one year by routes with an average length of 3,135 miles. What was the total distance traveled during the year?

6. An ocean liner has on board 825 men, 498 women, and 78 children. How many persons are on board?

7. In crossing the ocean, the fare paid depends upon the stateroom chosen. What is the difference between a fare of \$125.00 and one of \$52.50? What does this difference amount to on two fares?

8. Mr. and Mrs. White buy tickets at \$75.00 apiece. In crossing the ocean their fees and other expenses come to \$8.75 apiece. How much does the voyage cost them?

\*9. Traveling at the rate of 21 miles an hour, how many hours does it take to cross the ocean by a route 3,360 miles long? How many days does it take?

\*10. Find how much faster per hour a steamboat travels that covers 360 miles in 18 hours than one that covers the same distance in 24 hours.

### 63. Review and Practice with the Number Nine

[Without pencil.]

1. Practice adding, then subtracting:

10	12	11	19	13	15	18	17	16
<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>

2. Count by 9 from 9 to 108.

3. Count by 9 into the fifties. Begin in turn with 1, 2, 3, 4, 5, 6, 7, and 8.

4. Practice multiplying 9 by: 2; 4; 3; 5; 6; 8; 7; 11; 9; 12.

5. Find  $\frac{1}{9}$  and then  $\frac{7}{9}$  of each of these numbers.

18	27	90	54	72	108
36	45	63	99	81	900

Practice until you can add these columns at a steady rate.

6.	9	4	9	5	4
	2	9	4	9	9
	3	6	4	7	9
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
7.	5	9	7	2	9
	9	2	9	9	3
	6	9	5	9	7
	9	3	9	0	9
	2	5	7	6	5
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

8.	3	5	9	8	9
	6	9	6	9	5
	5	0	9	6	9
	9	5	9	9	8
	2	9	4	4	5
	4	5	9	9	9
	9	9	7	8	9
	4	8	4	7	8
	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

Add and test:

[With pencil.]

9.	1499	10.	3990	11.	1649	12.	2943	13.	6891
	3596		4994		2993		5999		9959
	2655		1477		3688		4772		8863
	5969		9749		5649		7679		7899
	<u>4892</u>		<u>2994</u>		<u>1995</u>		<u>6996</u>		<u>9974</u>

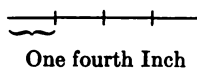
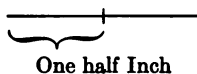
Find answers and test them:

- |                         |                                   |
|-------------------------|-----------------------------------|
| 14. $522 - 499 = ?$     | 23. $876 \times 99 = ?$           |
| 15. $654 - 299 = ?$     | 24. $1,980 \div 9 = ?$            |
| 16. $1,443 - 999 = ?$   | 25. $\frac{1}{8}$ of $3060 = ?$   |
| 17. $1,515 - 909 = ?$   | 26. $\frac{2}{9}$ of $18,270 = ?$ |
| 18. $1,776 - 989 = ?$   | 27. $28,890 \div 90 = ?$          |
| 19. $325 \times 9 = ?$  | 28. $12,078 \div 99 = ?$          |
| 20. $896 \times 9 = ?$  | 29. $\$9.87 \times 90 = ?$        |
| 21. $425 \times 90 = ?$ | 30. $\$20.25 \div 9 = ?$          |
| 22. $312 \times 99 = ?$ | 31. $\$307.80 \div 90 = ?$        |

To THE TEACHER: For further practice in the fundamental processes, see pages 252, 268-274.

## CHAPTER VI. MAKING TOYS AND OTHER ARTICLES<sup>1</sup>

### 64. A Tag and a Thread Winder



1. How is one half of an inch found?  
How is one fourth of an inch found?

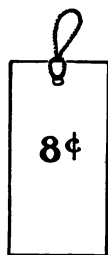
2. Find on a ruler:  $\frac{1}{2}$  inch;  $1\frac{1}{2}$  inches;  
 $\frac{1}{4}$  inch;  $\frac{3}{4}$  of an inch;  $1\frac{1}{4}$  inches;  $1\frac{3}{4}$  inches.

3. Try to tell, without measuring, the length and width of the price tag in the drawing.

4. Measure the tag.

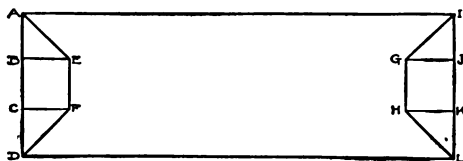
5. Find, by measuring, the length and width of this thread winder.

6. Try to tell, without measuring, the distance from A to B on the thread winder; also the distances from A to C and from A to D.



Price Tag

7. Find other distances, between the letters on the pattern,



Thread Winder

that equal a half-inch;  
that equal a quarter-inch; that equal three quarters of an inch.

\*8. In making the price tag, tough paper is used. The pattern is drawn on the

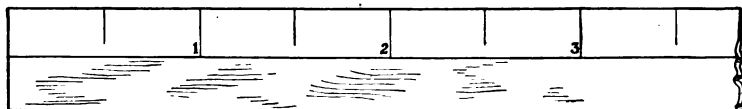
<sup>1</sup> For the work in this chapter pupils should have foot rules in their hands. Noiseless cardboard ones may be obtained.

paper and cut out. A hole is punched near the top of the tag at equal distances from the two side edges. A string 4 inches long with its ends tied together is then looped through the hole. Make the price tag.

\*9. In making the thread winder, stiff cardboard is used. The pattern is drawn carefully and then cut out on the lines L, H, G, I, A, E, F, D, L. Make the thread winder.

### 65. Making Boxes

I



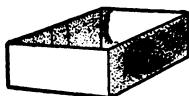
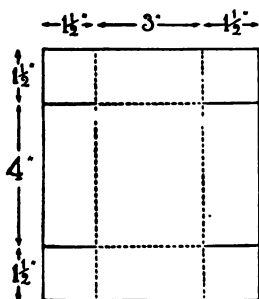
[Without pencil.]

1. Study this measure. Find on it a distance 1 inch long.  
A distance  $\frac{1}{2}$  inch long.

2. How many half-inches are marked in each inch?
3. How many inches are there in 2 half-inches?
4. Add  $\frac{1}{2}$  inch to a line  $\frac{1}{2}$  inch long. What is the length?
5. What length of line equals  $1\frac{1}{2}$  inches extended  $\frac{1}{2}$  inch?
6. What length of line equals  $2\frac{1}{2}$  inches extended  $\frac{1}{2}$  inch?
7. How long a line is left if a half-inch is cut from a line 1 inch long? From a line 2 inches long?

- |                                       |                                       |                                           |
|---------------------------------------|---------------------------------------|-------------------------------------------|
| 8. $\frac{1}{2} + \frac{1}{2} = ?$    | 9. $1\frac{1}{2} + \frac{1}{2} = ?$   | 10. $2\frac{1}{2} + \frac{1}{2} = ?$      |
| 11. $1\frac{1}{2} + 1\frac{1}{2} = ?$ | 12. $2\frac{1}{2} + 1\frac{1}{2} = ?$ | 13. $2\frac{1}{2} + 3 + 2\frac{1}{2} = ?$ |
| 14. $1 - \frac{1}{2} = ?$             | 15. $1\frac{1}{2} - \frac{1}{2} = ?$  | 16. $2 - \frac{1}{2} = ?$                 |

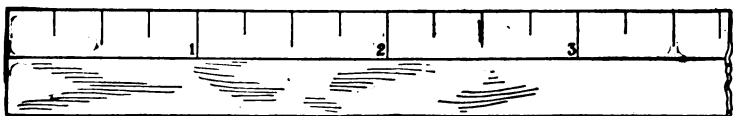




17. This is a pattern for a box. What sign is used to stand for inches?

18. Find the length and width of material required for the box.

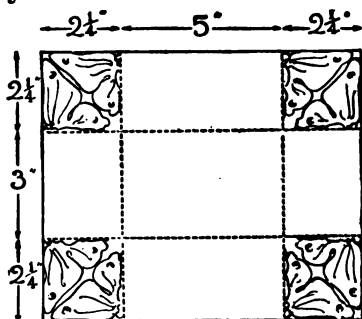
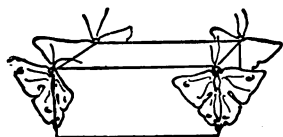
## II



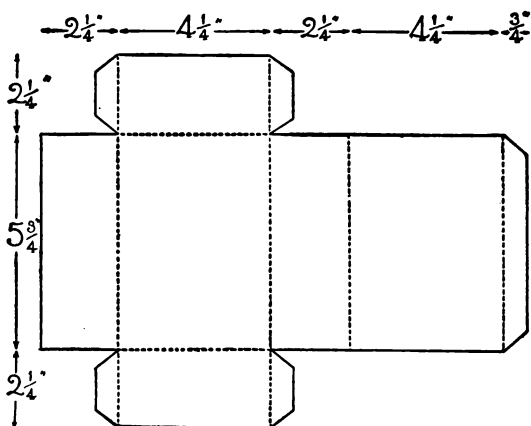
[Use pencil only when needed.]

1. How many quarters or fourths in 1 inch? In 2 inches?
2. How many inches in 4 quarter-inches? In 8 quarters?
3. How many whole inches in  $\frac{4}{4}$ ? In  $\frac{8}{4}$ ?
4. Study the measure to discover other facts about fourths.
5.  $\frac{3}{4} + \frac{1}{4} = ?$        $1\frac{3}{4} + \frac{1}{4} = ?$        $2\frac{3}{4} + 1\frac{1}{4} = ?$
6. How many quarters of an inch in a half-inch?
7. How many half-inches in 2 quarters of an inch?
8.  $\frac{1}{2} = \frac{?}{4}$      $\frac{2}{4} = \frac{?}{2}$      $\frac{1}{4} + \frac{1}{4} = \frac{?}{2}$
9.  $1\frac{1}{4} + \frac{1}{4} = ?$      $2\frac{1}{4} + \frac{1}{4} = ?$      $3\frac{1}{4} + \frac{1}{4} = ?$
10.  $\frac{1}{4} - \frac{1}{4} = ?$      $1\frac{1}{4} - \frac{1}{4} = ?$      $2\frac{1}{4} - 1\frac{1}{4} = ?$
11.  $\frac{3}{4} - \frac{1}{4} = ?$      $1\frac{3}{4} - \frac{1}{4} = ?$      $2\frac{3}{4} - \frac{1}{4} = ?$

12. Here are patterns for candy boxes:



Pattern for Butterfly Candy Box



Pattern for Oblong Candy Box

Find the length and width of paper required for each box, and then choose one of the boxes and make it according to measurements.

To make either one of the boxes, draw the patterns to measurement on heavy paper; then cut on the heavy lines and fold on the dotted lines.

## 66. Changing Halves to Fourths

[Without pencil.]

1. How long is a line made up of two parts, if one part is  $\frac{1}{2}$  of an inch long and the other  $\frac{1}{4}$  of an inch long?

$$\frac{1}{2}'' + \frac{1}{4}'' = ?$$

Since  $\frac{1}{2}'' = \frac{2}{4}''$ ,  $\frac{1}{2}'' + \frac{1}{4}'' = \frac{2}{4}'' + \frac{1}{4}''$ , or  $\frac{3}{4}''$ .

2. How much longer is a line  $1\frac{3}{4}''$  long than a line  $\frac{1}{2}''$  long?

$$1\frac{3}{4}'' - \frac{1}{2}'' = ?$$

Since  $\frac{1}{2}'' = \frac{2}{4}''$ ,  $1\frac{3}{4}'' - \frac{1}{2}'' = 1\frac{3}{4}'' - \frac{2}{4}''$ , or  $1\frac{1}{4}''$ .

3. To add or subtract halves and fourths, what change is made in the halves?

Find answers:

4.  $2\frac{1}{4} + \frac{1}{2} = ?$

7.  $2\frac{1}{2} + \frac{1}{4} = ?$

10.  $\frac{3}{4} - \frac{1}{2} = ?$

5.  $3\frac{1}{4} + \frac{1}{2} = ?$

8.  $1\frac{1}{2} - \frac{1}{4} = ?$

11.  $2\frac{3}{4} - \frac{1}{2} = ?$

6.  $1\frac{1}{2} + \frac{1}{4} = ?$

9.  $3\frac{1}{2} - \frac{1}{4} = ?$

12.  $4\frac{3}{4} - 1\frac{1}{2} = ?$

13. Two aprons are to be made. One requires  $1\frac{1}{2}$  yards of muslin; the other,  $1\frac{1}{4}$  yards. How many yards are needed.

14. From a piece of lace  $1\frac{3}{4}$  yards long, a piece  $\frac{1}{2}$  yard long is cut. What is the length of the lace left?

15. Helen uses  $1\frac{1}{2}$  yards of ribbon for her hair, and  $2\frac{1}{4}$  yards for hat trimming. Find the number of yards in the two pieces.

16. Rope for two swings is to be bought. One requires  $4\frac{1}{2}$  yards of rope; the other,  $4\frac{1}{4}$  yards. How many yards are required for the two?

17. Tom has  $5\frac{1}{2}$  yards of string. From this he uses  $2\frac{1}{4}$  yards for the tail of his kite. How many yards are left.

### 67. Making Envelopes

[Use pencil only when needed.]

1. Fold a sheet of paper into 8 equal parts. Point out one of the eight equal parts and name it.
2. How is  $\frac{1}{8}$  of a unit or whole object found?
3. Draw a square, a circle, and a line. Divide each first into quarters and then into eighths.

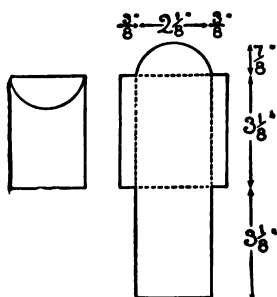


4. How is an eighth of an inch found?
5. How many eighths of an inch in 1 inch? In 2 inches?
6. How many inches in 8 eighths of an inch? In 16 eighths?
7. Study the measure to discover other facts about eighths.
8. How many eighths of an inch in  $\frac{1}{2}$  inch? In  $\frac{1}{4}$  of an inch? In  $\frac{3}{4}$  of an inch?
9. What part of an inch is 4 eighths of an inch? 2 eighths? 6 eighths?

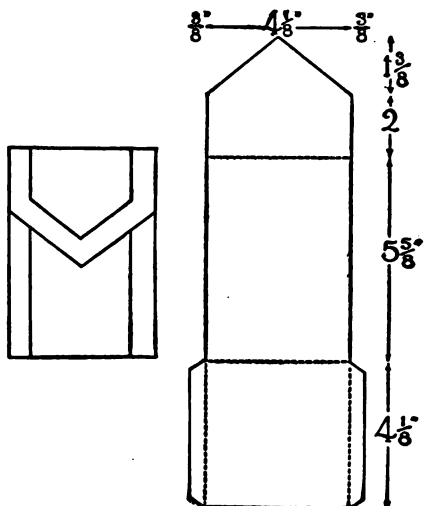
Find answers:

10.  $\frac{3}{8} + \frac{1}{8} = ?$     14.  $\frac{7}{8} + \frac{1}{8} = ?$     18.  $\frac{5}{8} + \frac{1}{8} = ?$     22.  $\frac{5}{8} + \frac{3}{8} = ?$
11.  $1\frac{3}{8} + \frac{1}{8} = ?$     15.  $1\frac{7}{8} + \frac{1}{8} = ?$     19.  $1\frac{5}{8} + \frac{1}{8} = ?$     23.  $2\frac{5}{8} + \frac{3}{8} = ?$
12.  $\frac{3}{8} - \frac{1}{8} = ?$     16.  $\frac{7}{8} - \frac{1}{8} = ?$     20.  $\frac{5}{8} - \frac{1}{8} = ?$     24.  $\frac{5}{8} - \frac{3}{8} = ?$
13.  $2\frac{3}{8} - \frac{1}{8} = ?$     17.  $2\frac{7}{8} - \frac{1}{8} = ?$     21.  $2\frac{5}{8} - \frac{1}{8} = ?$     25.  $2\frac{5}{8} - \frac{3}{8} = ?$
26. What length of line equals the sum of  $2\frac{3}{8}$  inches and  $1\frac{1}{8}$  inches?

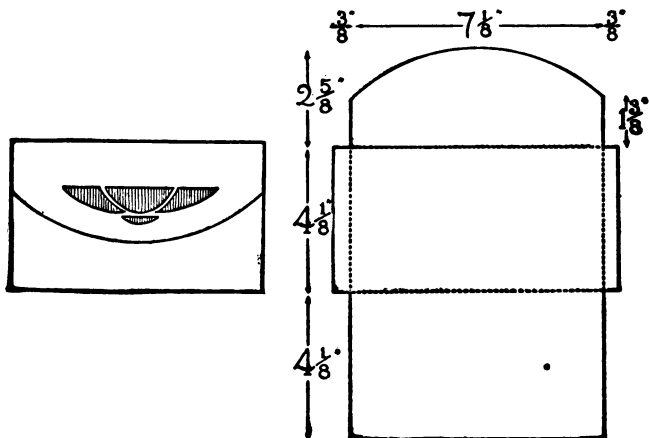
The seed envelope pictured here is made of manila paper; the fancy envelope and the postal-card case are made of heavy colored paper.



Seed Envelope



Envelope, or Case, for Postal Cards



Fancy Envelope

27. Find the length and width of paper required for each envelope; then choose one and make it according to measurements.

### 68. Changing Halves and Fourths to Eighths

[Without pencil.]

1. How long is a line that equals the sum of a line  $\frac{1}{2}$  inch long and a line  $\frac{3}{8}$  of an inch long?

$$\frac{1}{2} + \frac{3}{8} = ? \quad \frac{1}{2} = \frac{4}{8}. \quad \frac{4}{8} + \frac{3}{8} = \frac{7}{8}. \quad \frac{1}{2} + \frac{3}{8} = \frac{7}{8}.$$

2. To add or subtract halves and eighths, what change is made in the halves?

$$3. \frac{1}{2} + \frac{1}{8} = ? \quad \frac{1}{2} + \frac{5}{8} = ? \quad \frac{7}{8} + \frac{1}{2} = ? \quad 1\frac{1}{2} + \frac{3}{8} = ?$$

$$4. \frac{1}{2} - \frac{1}{8} = ? \quad \frac{5}{8} - \frac{1}{2} = ? \quad \frac{7}{8} - \frac{1}{2} = ? \quad 1\frac{1}{2} - \frac{3}{8} = ?$$

5. How long is a line that equals the sum of a line  $\frac{1}{4}$  inch long and a line  $\frac{5}{8}$  of an inch long?

$$\frac{1}{4} + \frac{5}{8} = ? \quad \frac{1}{4} = \frac{2}{8}. \quad \frac{2}{8} + \frac{5}{8} = \frac{7}{8}. \quad \frac{1}{4} + \frac{5}{8} = \frac{7}{8}.$$

6. How much longer is a line  $\frac{7}{8}$  of an inch long than a line  $\frac{3}{4}$  of an inch long?

$$\frac{7}{8} - \frac{3}{4} = ? \quad \frac{3}{4} = \frac{6}{8}. \quad \frac{7}{8} - \frac{6}{8} = \frac{1}{8}. \quad \frac{7}{8} - \frac{3}{4} = \frac{1}{8}.$$

7. To add or subtract fourths and eighths, what change is made in the fourths?

Find answers:

$$8. \frac{1}{8} + \frac{1}{4} = ? \quad 11. \frac{3}{8} - \frac{1}{4} = ? \quad 14. 1\frac{1}{4} + \frac{1}{8} = ? \quad 17. \frac{3}{4} + \frac{1}{8} = ?$$

$$9. \frac{3}{8} + \frac{1}{4} = ? \quad 12. \frac{5}{8} - \frac{1}{4} = ? \quad 15. \frac{1}{4} - \frac{1}{8} = ? \quad 18. \frac{3}{4} - \frac{1}{8} = ?$$

$$10. \frac{5}{8} + \frac{1}{4} = ? \quad 13. \frac{7}{8} - \frac{1}{4} = ? \quad 16. 1\frac{1}{4} - \frac{1}{8} = ? \quad 19. \frac{3}{4} - \frac{3}{8} = ?$$

\*20. What length of line equals the sum of  $2\frac{1}{4}$  inches and  $1\frac{1}{8}$  inches? The difference between  $2\frac{1}{4}$  inches and  $1\frac{1}{8}$  inches?

### 69. A Fraction and its Terms

1. To find  $\frac{1}{2}$  of an inch, an inch is divided into 2 equal parts. How is  $\frac{1}{2}$  of an apple found? How is  $\frac{1}{2}$  of a pie found? How is  $\frac{1}{2}$  of any whole thing found?

2. How is  $\frac{1}{4}$  of any whole thing found? How is  $\frac{1}{8}$  found?

3. How is  $\frac{3}{4}$  of an inch found? How is  $\frac{3}{4}$  of any whole thing found? How is  $\frac{7}{8}$  found?

An inch, a foot, an apple, an orange, a pile of books, or anything regarded as one whole thing is called a **unit**.

Such parts of a unit as  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{1}{8}$ , and  $\frac{7}{8}$  are called **fractions**.

The number below the line, showing into how many equal parts a unit is divided, is called the **denominator** of the fraction.

Denominator means "namer." In the fraction  $\frac{1}{2}$ , 2 is the denominator. In the fraction  $\frac{3}{4}$ , 4 is the denominator.

The number written above the line, showing how many of the equal parts are taken, is called the **numerator** of the fraction.

Numerator means "numberer." In the fraction  $\frac{1}{2}$ , 1 is the numerator. In the fraction  $\frac{3}{4}$ , 3 is the numerator.

The numerator and denominator are called the **terms** of a fraction.

4. Name the denominators:

$$\frac{1}{4} \quad \frac{2}{3} \quad \frac{7}{8} \quad \frac{5}{6} \quad \frac{4}{5} \quad \frac{3}{7} \quad \frac{11}{12}$$

5. Name the numerators in the fractions in Exercise 4.

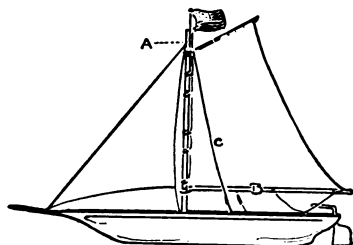
Such numbers as 4, 12, 24, and 100 are called **whole numbers**.

## 70. Making a Boy's Sailboat

[Without pencil.]

1. Tom found a piece of timber  $1\frac{3}{4}$  feet long. He cut off  $\frac{1}{2}$  foot from the length of the timber and whittled the longer piece into a sailboat. How long was the piece of timber used?

2. Tom made the mast and the boom of a narrow strip of wood. What was the length of the two when put end to end if the mast was  $1\frac{1}{4}$  feet long and the boom  $\frac{3}{4}$  of a foot long?



A - MAST  
B - BOOM  
C - SUPPORT

3. The two supports for the mast were made of wire. Each support required a wire  $1\frac{1}{2}$  feet long. Find the amount required for the two supports.

4. A cord was used to extend from the top of the mast to the end of the bow and to fasten the sail. How much cord was used if  $1\frac{1}{4}$  feet were used in one place and  $1\frac{3}{4}$  in the other?

5. Tom bought  $\frac{3}{4}$  of a yard of cloth for the sails, but used only  $\frac{1}{4}$  of a yard. How much did he have left?

## 71. Dressing a Doll

[Without pencil.]

1. Helen dressed a doll for her sister's birthday present. How much muslin did Helen use for the doll's dress if she used one piece  $\frac{1}{2}$  yard long and another  $\frac{1}{4}$  of a yard long?



2. For trimming, Helen used  $\frac{1}{2}$  yard of lace on the doll's skirt and  $\frac{1}{8}$  of a yard on the doll's waist. How long a piece of lace was needed?

3. In making the doll's sash, Helen cut a piece of ribbon  $\frac{1}{4}$  of a yard long from a piece  $\frac{7}{8}$  of a yard long and used the longer piece for the sash. How long was the doll's sash?



4. Helen made the doll's hat of straw. For the crown she used  $\frac{1}{8}$  of a yard of braid; for the brim,  $\frac{5}{8}$  of a yard. What part of a yard did Helen use in all?

5. From a piece of red cashmere  $\frac{1}{2}$  yard long, Helen cut a piece  $\frac{3}{8}$  of a yard long to use for a doll's cloak. What part of a yard was left?

## 72. Review and Practice

[Without pencil.]

- |                                      |                                      |                                      |                                      |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 1. $\frac{1}{2} + \frac{1}{2} = ?$   | 6. $\frac{1}{4} + \frac{1}{4} = ?$   | 11. $\frac{3}{4} + \frac{1}{4} = ?$  | 16. $\frac{1}{2} + \frac{1}{4} = ?$  |
| 2. $1\frac{1}{2} + \frac{1}{2} = ?$  | 7. $1\frac{1}{4} + \frac{1}{4} = ?$  | 12. $1\frac{3}{4} + \frac{1}{4} = ?$ | 17. $1\frac{1}{2} + \frac{1}{4} = ?$ |
| 3. $2\frac{1}{2} + \frac{1}{2} = ?$  | 8. $2\frac{1}{4} + \frac{1}{4} = ?$  | 13. $2\frac{3}{4} + \frac{1}{4} = ?$ | 18. $\frac{1}{2} - \frac{1}{4} = ?$  |
| 4. $1\frac{1}{2} - \frac{1}{2} = ?$  | 9. $1\frac{1}{4} - \frac{1}{4} = ?$  | 14. $\frac{3}{4} - \frac{1}{4} = ?$  | 19. $1\frac{1}{2} - \frac{1}{4} = ?$ |
| 5. $2\frac{1}{2} - \frac{1}{2} = ?$  | 10. $3\frac{1}{4} - \frac{1}{4} = ?$ | 15. $1\frac{3}{4} - \frac{1}{4} = ?$ | 20. $2\frac{1}{2} - \frac{1}{4} = ?$ |
| 21. $\frac{7}{8} + \frac{1}{8} = ?$  | 25. $\frac{5}{8} + \frac{3}{8} = ?$  | 29. $\frac{3}{8} + \frac{1}{4} = ?$  | 33. $\frac{1}{2} + \frac{3}{8} = ?$  |
| 22. $1\frac{7}{8} + \frac{1}{8} = ?$ | 26. $\frac{5}{8} - \frac{3}{8} = ?$  | 30. $\frac{5}{8} + \frac{1}{4} = ?$  | 34. $1\frac{1}{2} + \frac{3}{8} = ?$ |
| 23. $\frac{7}{8} - \frac{1}{8} = ?$  | 27. $1\frac{5}{8} - \frac{3}{8} = ?$ | 31. $\frac{3}{8} - \frac{1}{4} = ?$  | 35. $\frac{1}{2} - \frac{3}{8} = ?$  |
| 24. $2\frac{7}{8} - \frac{1}{8} = ?$ | 28. $2\frac{5}{8} - \frac{3}{8} = ?$ | 32. $\frac{5}{8} - \frac{1}{4} = ?$  | 36. $1\frac{1}{2} - \frac{1}{8} = ?$ |

[Use pencil only when needed.]

Find the sums:

$$\begin{array}{r}
 37. \quad 2\frac{1}{2} \\
 1\frac{1}{2} \\
 \underline{3}
 \end{array}
 \quad
 \begin{array}{r}
 38. \quad 3\frac{1}{4} \\
 2\frac{1}{4} \\
 \underline{1\frac{1}{4}}
 \end{array}
 \quad
 \begin{array}{r}
 39. \quad 4\frac{1}{8} \\
 2\frac{3}{8} \\
 \underline{3\frac{3}{8}}
 \end{array}
 \quad
 \begin{array}{r}
 40. \quad 3\frac{1}{4} \\
 2\frac{1}{4} \\
 \underline{2}
 \end{array}
 \quad
 \begin{array}{r}
 41. \quad 4\frac{1}{2} \\
 4\frac{1}{2} \\
 \underline{3\frac{1}{2}}
 \end{array}
 \quad
 \begin{array}{r}
 42. \quad 3\frac{3}{4} \\
 2\frac{1}{4} \\
 \underline{3}
 \end{array}$$

$$\begin{array}{r}
 43. \quad 3\frac{1}{8} \\
 2\frac{3}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 44. \quad 4\frac{5}{8} \\
 2\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 45. \quad 1\frac{3}{4} \\
 5\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 46. \quad 3\frac{7}{8} \\
 2\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 47. \quad 5\frac{3}{4} \\
 3\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 48. \quad 6\frac{3}{8} \\
 2\frac{3}{8} \\
 \underline{\phantom{0}}
 \end{array}$$

$$\begin{array}{r}
 49. \quad 2\frac{1}{8} \\
 3\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 50. \quad 4\frac{1}{2} \\
 2\frac{1}{2} \\
 \underline{3\frac{1}{4}}
 \end{array}
 \quad
 \begin{array}{r}
 51. \quad 5\frac{5}{8} \\
 3\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 52. \quad 6\frac{1}{4} \\
 3\frac{1}{2} \\
 \underline{4\frac{1}{4}}
 \end{array}
 \quad
 \begin{array}{r}
 53. \quad 2\frac{3}{4} \\
 3\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 54. \quad 6\frac{1}{8} \\
 7\frac{1}{8} \\
 \underline{3\frac{3}{4}}
 \end{array}$$

Find the differences:

$$\begin{array}{r}
 55. \quad 6\frac{1}{2} \\
 3 \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 56. \quad 4\frac{1}{2} \\
 2\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 57. \quad 7\frac{3}{4} \\
 4 \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 58. \quad 8\frac{1}{8} \\
 4 \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 59. \quad 12\frac{1}{4} \\
 3\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 60. \quad 6\frac{3}{8} \\
 2 \\
 \underline{\phantom{0}}
 \end{array}$$

$$\begin{array}{r}
 61. \quad 10\frac{5}{8} \\
 2\frac{5}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 62. \quad 8\frac{1}{8} \\
 3\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 63. \quad 5\frac{3}{4} \\
 2\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 64. \quad 8\frac{3}{8} \\
 4\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 65. \quad 7\frac{7}{8} \\
 4\frac{5}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 66. \quad 12\frac{5}{8} \\
 4\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}$$

$$\begin{array}{r}
 67. \quad 3\frac{3}{4} \\
 1\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 68. \quad 10\frac{1}{2} \\
 2\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 69. \quad 12\frac{5}{8} \\
 6\frac{3}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 70. \quad 24\frac{7}{8} \\
 10\frac{3}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 71. \quad 8\frac{1}{2} \\
 3\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 72. \quad 4\frac{1}{2} \\
 1\frac{3}{8} \\
 \underline{\phantom{0}}
 \end{array}$$

$$\begin{array}{r}
 73. \quad 6\frac{1}{2} \\
 2\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 74. \quad 10\frac{3}{4} \\
 3\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 75. \quad 20\frac{5}{8} \\
 10\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 76. \quad 14\frac{1}{4} \\
 10\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 77. \quad 16\frac{7}{8} \\
 8\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 78. \quad 7\frac{3}{4} \\
 4\frac{1}{8} \\
 \underline{\phantom{0}}
 \end{array}$$

$$\begin{array}{r}
 *79. \quad 2 \\
 1\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 *80. \quad 4 \\
 1\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 *81. \quad 6 \\
 2\frac{1}{2} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 *82. \quad 3 \\
 1\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 *83. \quad 8 \\
 3\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}
 \quad
 \begin{array}{r}
 *84. \quad 9 \\
 5\frac{1}{4} \\
 \underline{\phantom{0}}
 \end{array}$$

## 73. Review and Practice

[With pencil.]

Add by columns and then by rows, testing each sum:

1.	2.	3.	4.	5.
6. 4 252	4 250	3 427	4 234	5 668
7. 3 647	3 446	4 562	4 565	6 657
8. 5 656	5 567	6 569	466	3 656
9. 4 565	5 462	6 655	564	4 655
10. 3 058	6 459	5 658	4 626	6 453
11. <u>4 564</u>	<u>5 463</u>	<u>4 040</u>	<u>3 653</u>	<u>6 566</u>

Add:

12. \$65.60, \$32.54, \$40.45, \$62.45, \$9.63, \$5.43, \$16.63.

13. \$42.65, \$6.46, \$5.24, \$36.65, \$540.24, \$106.40.

Find the answers:

14.  $4,328 - 4,211 = ?$

27.  $\$76.89 \times 52 = ?$

15.  $93,642 - 2,136 = ?$

28.  $\$124.40 \times 18 = ?$

16.  $86,400 - 5,240 = ?$

29.  $872 \div 4 = ?$

17.  $98,042 - 7,311 = ?$

30.  $1,278 \div 6 = ?$

18.  $\$20.75 - \$10.25 = ?$

31.  $3,204 \div 5 = ?$

19.  $\$42.00 - \$35.50 = ?$

32.  $7,740 \div 45 = ?$

20.  $\$150.00 - \$30.20 = ?$

33.  $2,093 \div 91 = ?$

21.  $287 \times 9 = ?$

34.  $75,500 \div 302 = ?$

22.  $368 \times 46 = ?$

35.  $9,765 \div 31 = ?$

23.  $694 \times 89 = ?$

36.  $50,922 \div 82 = ?$

24.  $428 \times 203 = ?$

37.  $4,520 \div 920 = ?$

25.  $3,604 \times 126 = ?$

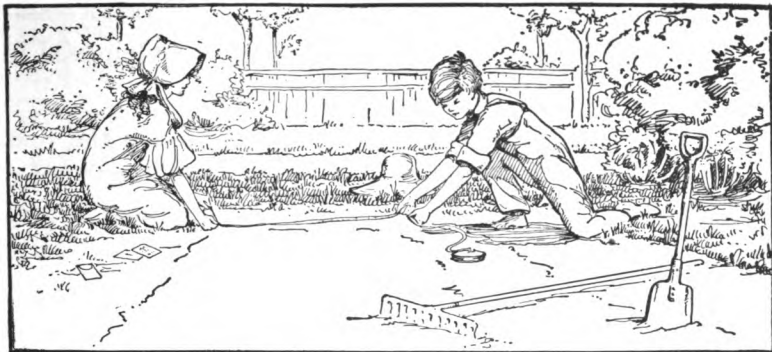
38.  $\frac{4}{5} \times 625 = ?$

26.  $\$98.67 \times 34 = ?$

39.  $\frac{3}{8} \times 1760 = ?$

## CHAPTER VII. USEFUL MEASUREMENTS

### 74. Garden Measurements



#### I

[Without pencil.]

1. A tape line marked with inches, feet, and yards is to be used in measuring a garden. How many inches will be found marked in each foot? In each yard? How many feet will be marked in each yard?

2. A bed is to be laid out 15 feet long and 6 feet wide. How many yards long is it to be? How many yards wide?

3. A garden path is to be 8 yards long. What will be its length in feet?

4. How many yards are there in 9 ft.? In 24 ft.?

5. How many feet are there in 6 yd.? In 12 yd.? In 20 yd.?

Reduce:

6. 12 ft. to yards.

9. 2 yd. 1 ft. to feet.

7. 16 ft. “ “

10. 12 yd. 1 ft. “ “

8. 32 ft. “ “

11. 30 yd. 2 ft. “ “

## II

[Without pencil.]

Such parts of a foot as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{3}$ , and  $\frac{3}{4}$  are often used in measuring.

1. Draw three lines, each 1 foot long. Divide the first into halves, the second into thirds, and the third into fourths.

2. How many inches are there in  $\frac{1}{2}$  of a foot? In  $\frac{1}{4}$  of a foot? In  $\frac{3}{4}$ ? In  $\frac{1}{3}$ ? In  $\frac{2}{3}$ ?

Reduce:

3.  $2\frac{1}{2}$  ft. to inches. 8.  $1\frac{1}{3}$  ft. to inches. 13. 18 in. to feet.

4.  $1\frac{1}{4}$  ft. “ “ 9.  $3\frac{1}{3}$  ft. “ “ 14. 42 in. “ “

5.  $1\frac{3}{4}$  ft. “ “ 10.  $1\frac{2}{3}$  ft. “ “ 15. 15 in. “ “

6.  $2\frac{1}{4}$  ft. “ “ 11.  $8\frac{2}{3}$  ft. “ “ 16. 16 in. “ “

7.  $2\frac{3}{4}$  ft. “ “ 12.  $12\frac{2}{3}$  ft. “ “ 17. 33 in. “ “

18. A garden path is  $1\frac{1}{2}$  ft. wide. How many inches wide is it?

19. How many inches wide is a flower bed  $2\frac{1}{4}$  feet wide?

20. A fence post is 54 in. high. What is its height in feet?

\*21. A lettuce bed is 48 inches wide and 72 inches long. Find its perimeter in feet.

\*22. What is the perimeter in feet of a flower bed 30 inches wide and 60 inches long?

## III

[Without pencil.]

1. Draw two lines each 1 yard long. Divide one into halves and then into fourths. Divide the other into thirds.

Reduce:

- |                                 |                               |                      |
|---------------------------------|-------------------------------|----------------------|
| 2. $\frac{1}{2}$ yd. to inches. | 7. $\frac{1}{3}$ yd. to feet. | 12. 18 in. to yards. |
| 3. $\frac{1}{4}$ yd. " "        | 8. $\frac{2}{3}$ yd. " "      | 13. 27 in. " "       |
| 4. $\frac{3}{4}$ yd. " "        | 9. $1\frac{1}{3}$ yd. " "     | 14. 45 in. " "       |
| 5. $\frac{1}{3}$ yd. " "        | 10. $2\frac{2}{3}$ yd. " "    | 15. 10 ft. " "       |
| 6. $\frac{2}{3}$ yd. " "        | 11. $2\frac{1}{2}$ yd. " "    | 16. 25 ft. " "       |

17. A walk is 27 inches wide. What part of a yard wide is it?

18. The wire netting used to enclose a flower garden is  $\frac{2}{3}$  of a yard wide. What is its width in inches?

19. A fence is  $3\frac{1}{3}$  yards long. Find its length in feet.

20. Find the length in feet of a fence  $6\frac{1}{3}$  yards long. Of one  $12\frac{2}{3}$  yards long.

\*21. Tell in feet the difference in length between a rose garden  $8\frac{1}{3}$  yards long and one  $10\frac{2}{3}$  yards long?

## IV

Learn this table if you do not already know it:

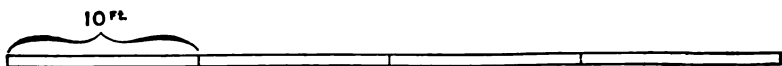
## TABLE OF LINEAR MEASURE

- 12 inches (in.) = 1 foot (ft.)  
 3 feet = 1 yard (yd.)  
 $16\frac{1}{2}$  feet = 1 rod (rd.)  
 5280 feet = 1 mile (mi.)

## 75. Drawing Garden Plans

I

[Use pencil only when needed.]



1. Each inch in this line stands for 10 feet. For how many feet does the entire length of the line stand?

2. A rectangular flower garden is 20 feet wide and 40 feet long. If you were to make a plan of the garden, drawing a line 1 inch long for each 10 feet, how wide would your plan be? How long? Make a drawing.

Using 1 inch to stand for 10 feet, draw a plan:

3. Of a rectangular strawberry bed 30 feet wide and 40 feet long.

4. Of a rectangular cabbage patch 50 feet wide, and 80 feet long.

5. Of a rectangular potato patch 20 feet wide and 120 feet long.

6. Using 1 inch for 5 feet, draw a plan of a rectangular rose garden 25 feet wide and 35 feet long.

\*7. Using 1 inch to stand for 8 feet, draw the plan of a rectangular garden 28 feet wide and 34 feet long.

II

[Use pencil only when needed.]

Margaret made a flower garden. First she marked out each bed with string, then she enclosed the garden with wire netting.

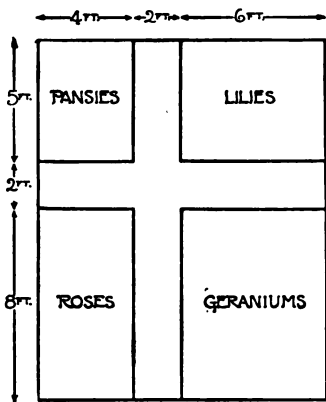
1. How many feet of string did Margaret need to go around the pansy bed? How many yards did she need?

2. Find the length in feet of the string required to mark out each of the other beds.

3. How many yards of wire netting did Margaret need for each of the short sides of her garden?

4. How many yards did she need for each of the two long sides?

5. How many yards did she need in all?



The Plan of Margaret's Garden

6. Find the cost of the netting at 12¢ a yard.

7. Plan a garden of your own. Draw a map of it.

8. Make a problem about fencing the garden.

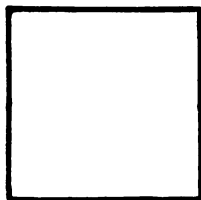
## 76. Finding Garden Areas

I

[Use pencil only when needed.]

In measuring land and other surfaces, the square inch, the square foot, and the square yard are used.

1. Find, from this drawing, the length of each side of a square inch.



A Square Inch



A **square inch** is a square measuring 1 inch on a side.

A **square foot** is a square measuring 1 foot on a side.

A **square yard** is a square measuring 1 yard on a side.

2. Cut from sheets of wrapping paper a square inch, a square foot, and a square yard.

3. Draw on paper a rectangle 2 inches wide and 4 inches long. Find, by applying the square inch cut from paper, how many square inches will cover it.

4. Draw on a blackboard a rectangle 2 feet wide and 3 feet long. Apply the square foot cut from paper to find how many square feet the rectangle contains.

5. Draw a square 2 feet on a side. Find the number of square feet in it.

6. Find the number of square feet in a square 3 feet on a side.

7. Mark off on your schoolroom floor a space 2 yards square. Find, by applying the square yard cut from paper, how many square yards it contains.

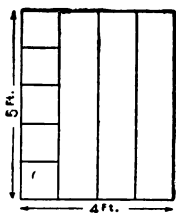
8. Find how many square yards there are in a space 1 yard wide and 3 yards long.

9. Estimate the number of square feet in one of your blackboards.

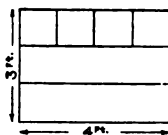
10. Estimate the number of square yards in the same blackboard.

Test your estimates as nearly as possible by applying the measures cut from paper.

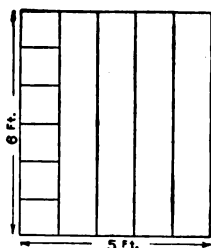
## II



No. 1



No. 2



No. 3

A garden bed is 4 feet wide and 5 feet long. How can the number of square feet in its surface be found without applying a square foot?

Since the bed is 4 feet wide and 5 feet long, it can be thought of as containing 4 rows of square feet with 5 square feet in each row. (See diagram No. 1.) The bed contains 4 times 5 square feet, or 20 square feet.

[Without pencil.]

1. Explain how to find the number of square feet in a bed 3 feet wide and 4 feet long. (See diagram No. 2.)

2. Explain how to find the number of square feet in a bed 5 feet wide and 6 feet long. (See diagram No. 3.)

The number of square units in a surface is called its **area**.

3. Find the area of each garden bed pictured above.

4. Draw a rectangle 2 inches wide and 3 inches long, and another 3 inches wide and 5 inches long. Divide each into square inches and find its area.

5. Make a rule for finding the area of a rectangle.

6. What is the area of a pane of glass 10 inches wide and 12 inches long? Of one 8 inches wide and 12 inches long?

7. How many square feet are there in a flower bed 2 feet wide and 10 feet long?

Find the area:

8. Of a bed 4 feet wide and 11 feet long.

9. Of a bed 6 feet wide and 12 feet long.

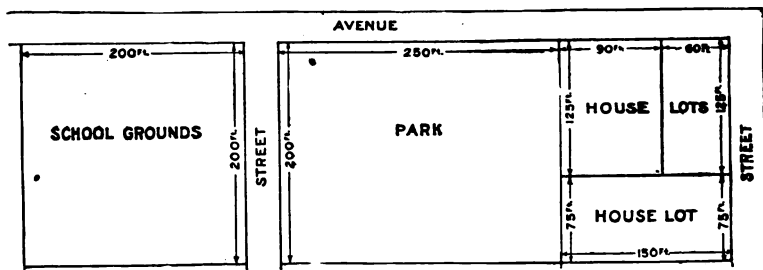
10. Of a bed 8 feet square.

11. Find the area in square feet of each bed in Margaret's flower garden (page 257).

12. How many square yards are there in a garden 2 yards wide and 5 yards long?

13. Find the area in square yards of a garden 6 yards wide and 10 yards long. Of one 12 yards square.

### 77. Measuring Building Lots



[With pencil.]

1. This is a map of part of two city blocks. What is the area of the school grounds?

2. What is the area of the park?

3. The map contains 3 house lots. One is 90 feet wide and

125 feet deep (that is, it measures 125 feet from front to back); another is 75 feet wide and 150 feet deep; and the other is 60 feet wide and 125 feet deep. Find the area of each.

Find the area:

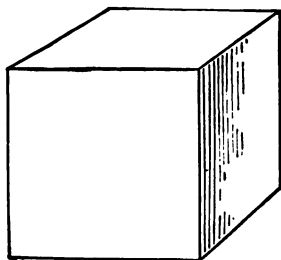
4. Of a building lot 40 feet wide and 125 feet deep.
5. Of a building lot 75 feet wide and 110 feet deep.
6. Of a building lot 85 feet wide and 150 feet deep.
- \*7. Land is selling for 25¢ a square foot. At that rate, how much must be paid for a lot 40 feet wide and 100 feet deep?
- \*8. How much more must a man pay for a building lot 50 feet wide and 100 feet deep at 15¢ a square foot than for a lot of the same size at 12¢ a square foot?

### 78. Measuring Boxes and Other Prisms

[Use pencil only when needed.]

A **prism** may be thought of as a block (of wood or some other substance) having rectangular surfaces.

1. This picture of a prism represents a cubic inch. What is its length? Its width? Its height?

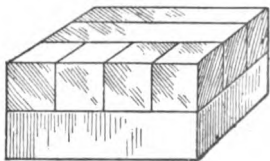


A Cubic Inch

2. A prism measuring 2 inches in each direction is called a two-inch cube. What name can be given to a prism measuring 3 inches in each direction? To one measuring 4 inches in each direction?

3. Build a two-inch cube with inch cubes. How many inch cubes are required? How many cubic inches are there in a two-inch cube?

4. Find, by building, how many cubic inches there are in a three-inch cube. In a four-inch cube.



A prism 4 inches long, 3 inches wide, and 2 inches high contains how many cubic inches?

A prism 4 inches long, 3 inches wide, and 2 inches high may be thought of as containing 2 layers of inch-cubes. Each layer may be thought of as containing 3 rows of inch-cubes; and each row, as containing 4 inch-cubes.

1 row = 4 cubic inches.

3 rows, or 1 layer, = 4 cubic inches multiplied by 3.

2 layers, or the whole prism, = 4 cubic inches multiplied by 3 and then by 2.

A prism 4 in. by 3 in. by 2 in. = 4 cubic inches  $\times 3 \times 2$ , or 24 cubic inches.

Build the following, and then tell how many cubic inches there are in each:

5. A prism 4 inches long, 2 inches wide, 2 inches high.

6. A prism 6 inches long, 3 inches wide, 2 inches high.

7. A prism 5 inches long, 4 inches wide, 3 inches high.

Tell, without building, how many cubic inches there are:

8. In a prism 3 inches long, 2 inches wide, 1 inch high.

9. In a prism 4 inches long, 3 inches wide, 2 inches high.

10. In a prism 5 inches long, 2 inches wide, 2 inches high.

11. In a prism 6 inches long, 2 inches wide, 3 inches high.
12. In a prism 10 inches long, 3 inches wide, 3 inches high.
13. How many inch-cubes can be fitted into a box measuring on the inside 3 inches in length, 2 inches in width, and 2 inches in height?
14. The inside dimensions of a candy box are: length, 6 inches; width, 4 inches; depth, 2 inches. How many caramels shaped as inch-cubes can be packed in it?
15. Name the inside dimensions of a box that might be used to hold exactly 6 cubic inches.

A cubic foot is a cube 1 foot long, 1 foot wide, and 1 foot high.

16. A wagon box 10 feet long and 3 feet wide is filled to an even depth of 1 foot with sand. How many cubic feet of sand does it contain?

17. A water tank 5 feet in length and 3 feet in width is filled to a depth of 2 feet with water. How many cubic feet of water does it contain?

18. How many inches in the length of a cubic foot? In its width? In its height?

19. Build a layer of inch-cubes which might be used as a base for a cubic foot. With the help of this layer, find the number of cubic inches in a cubic foot.

\*20. Find the number of cubic feet of air in your school-room.

\*21. How many cubic feet of air per person does your school-room contain?

## CHAPTER VIII. REVIEWS, TESTS, AND SUPPLEMENTARY PRACTICE

### 79. Review of Measures <sup>1</sup>

Reduce:

[Without pencil.]

- |                                                        |                                   |
|--------------------------------------------------------|-----------------------------------|
| 1. 12 ft. to yards.                                    | 9. $2\frac{1}{2}$ bu. to pecks.   |
| 2. $2\frac{2}{3}$ yd. to feet.                         | 10. 2 bu. 3 pk. to pecks.         |
| 3. $1\frac{1}{2}$ ft. to inches.                       | 11. 20 oz. to pounds.             |
| 4. $1\frac{1}{4}$ yd. to inches.                       | 12. $1\frac{1}{2}$ lb. to ounces. |
| 5. 1 yd. 6 in. to inches.                              | 13. 1 lb. 7 oz. to ounces.        |
| 6. $2\frac{1}{2}$ gal. to quarts.                      | 14. 4,000 lb. to tons.            |
| 7. 18 pt. to quarts.                                   | 15. $1\frac{1}{2}$ T. to pounds.  |
| 8. 12 pk. to bushels.                                  | 16. $2\frac{1}{2}$ T. to pounds.  |
| 17. Name some units of measure used in computing time. |                                   |

Reduce:

- |                                          |                         |
|------------------------------------------|-------------------------|
| 18. $1\frac{1}{4}$ minutes to seconds.   | 22. 35 days to weeks.   |
| 19. 90 seconds to minutes.               | 23. 12 weeks to days.   |
| 20. $1\frac{1}{2}$ hours to minutes.     | 24. 48 weeks to months. |
| 21. $\frac{3}{4}$ of an hour to minutes. | 25. 18 months to years. |

### 80. Problem Review <sup>1</sup>

[Without pencil.]

1. What is the distance in feet around a 12-inch square?
2. How many yards of string are required to mark out a flower bed 3 feet wide and 6 feet long?

<sup>1</sup> See footnote, page 210.

3. Cabbages are to be set in a row 27 feet long. How many plants are required if each is given a space of 3 feet?

4. It takes a trolley car 5 minutes to go a mile. At that rate how far does it travel in an hour?

5. A car passes a station every 12 minutes, beginning on the even hour. What is its time schedule between 8 o'clock and 9 o'clock in the morning?

6. A train due to reach a station at 15 minutes past 4 o'clock is  $\frac{1}{2}$  hour late. At what time does it reach the station?

7. Marion had a birthday party. 18 girls and 14 boys were there. How many children were at the party?

8. Margaret cut out a number of paper dolls from an old magazine. How many dolls did she have, if she had 4 families with 6 dolls in each, and 2 families with 7 dolls in each?

9. Robert bought some candy for a picnic. He bought  $1\frac{1}{2}$  pounds of one kind and  $2\frac{1}{2}$  pounds of another. How many pounds did he buy?

10. What is the value in cents of 2 dimes and 1 nickel? Of 1 quarter and 1 dime? Of 1 half-dollar and 12 cents?

11. Name a set of coins that might be received as change from 50¢ in buying a book for 20 cents.

12. Find the cost of 2 railway tickets at 35¢ each.

13. Oranges are selling at 60¢ a dozen. How much should be paid for  $\frac{1}{2}$  of a dozen?

14. Sugar is selling at 12¢ a pound. How many pounds can be bought for 60¢?



15. How much change should be received from a 50-cent piece in buying a pound of cheese at 28¢ and a box of crackers at 10¢?

16. How much change should be received from a dollar in buying 2 packages of tea at 40¢ a package?

17. Milk is selling at 8¢ a pint. How much must be paid for 2 quarts?

18. Apples are selling at \$1.60 a bushel. At that rate what is the price for a peck?

19. Eggs are selling at 60¢ a dozen. How much must I pay for 2 dozen? For  $\frac{1}{2}$  dozen? For  $1\frac{1}{2}$  dozen?

20. Tom earned 50¢ selling papers. He put  $\frac{2}{5}$  of this money in his toy bank, and spent the rest for a game. How much did the game cost?

21. Mary saved 5 cents each week for 10 weeks and then spent  $\frac{1}{2}$  of the money that she had saved. How much money did she spend?

[With pencil.]

22. A playground is 250 ft. long. Find its length in yards.

23. A rectangular garden is 204 feet wide and 325 feet long. What is its perimeter?

24. A building lot is 100 feet deep and 40 feet wide. How many square feet does it contain?

25. A railway train crosses the United States in 4 days. How many hours does it take?

26. A mile contains 5,280 feet. How many feet are there in half a mile?

27. New trees and shrubs are to be set out in a school yard. Find the cost of 24 trees and 96 shrubs at 75¢ each.

28. A city spends \$35.75 on each child attending its public schools. At this rate, how much does it cost the city a year to support a school with a membership of 405 children?

29. How much change should be received from a ten-dollar bill in buying 2 railway tickets at \$4.82 apiece?

30. What is the cost of a trip from Chicago to New York? The railway ticket costs \$18.50; the sleeping-car berth, \$5.00; and 3 meals in the dining car, 75¢ apiece.

31. A train traveling at the rate of 45 miles an hour covers the distance from Chicago to Buffalo in 12 hours. What is the distance between the two cities?

32. The railway distance from New York to New Orleans is 1,344 miles. Traveling at the rate of 32 miles an hour, how many hours are required for the trip?

33. The Upper Yosemite Falls, the highest waterfalls in the United States, are 2,600 feet in height. They are how many times as high as a school building 30 feet high?

34. One of the shortest routes across the Pacific Ocean is 4,218 miles long; one of the shortest across the Atlantic is 3,071 miles long. What is the difference in their lengths?

\*35. The distance from New York to Panama is 2,028 miles; and from Panama to San Francisco, 3,277 miles. Traveling at the rate of 21 miles an hour, how many hours are required for a voyage from New York to San Francisco? How many days does it take?

## 81. Test and Graded Practice

In this test are some of the important kinds of problems that you should be able to do by the end of the year. If, in the test, you fail to get the correct answer to a problem, use, for practice, the exercise having the same letter.

## I. TEST

[With pencil.]

Add:

$$\begin{array}{r} \text{A. } 6 \\ 4 \\ 7 \\ 3 \\ 8 \\ 5 \\ 6 \\ 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{B. } 2135 \\ 5674 \\ 9326 \\ 1475 \\ \underline{3648} \end{array}$$

$$\begin{array}{r} \text{C. } 346 \\ 543 \\ 278 \\ 964 \\ 543 \\ 287 \\ \underline{654} \end{array}$$

Find answers:

$$\text{D. } 1356 - 825 = ?$$

$$\text{E. } 1400 - 694 = ?$$

$$\text{F. } 1276 \times 8 = ?$$

$$\text{G. } 2547 \times 96 = ?$$

$$\text{H. } 1648 \times 304 = ?$$

$$\text{I. } \frac{5}{8} \times 3784 = ?$$

$$\text{J. } 1769 \div 5 = ? \quad \text{K. } 13,392 \div 31 = ? \quad \text{L. } 94,620 \div 38 = ?$$

$$\text{M. } 269,440 \div 421 = ? \quad \text{N. } 4\frac{1}{2} + 3\frac{1}{8} = ? \quad \text{O. } 6\frac{3}{4} - 2\frac{1}{8} = ?$$

II. PRACTICE<sup>1</sup>

[Write answers on the folds of a paper.]

A. Practice adding. Time limit, from 50 to 60 seconds.

3	2	1	4	9	7	8	5	2	4
1	5	4	4	1	5	5	4	9	4
2	1	6	5	3	2	3	5	3	4
4	3	6	5	4	7	8	9	6	5
<u>3</u>	<u>4</u>	<u>2</u>	<u>5</u>	<u>7</u>	<u>6</u>	<u>3</u>	<u>5</u>	<u>6</u>	<u>2</u>

<sup>1</sup> The time limits given here are the range for the last half year.

**A. Practice adding. Time limit, from 3 to 4 minutes.**

5	5	6	5	7	5	8	4	9	8
7	3	7	8	8	6	7	5	7	9
5	3	5	7	5	8	6	7	6	9
4	3	6	5	7	4	8	4	3	8
1	4	5	5	3	3	2	5	9	3
3	3	4	1	7	3	8	1	9	2
2	2	3	4	3	5	3	3	5	7
3	5	6	7	7	5	8	5	9	8
9	7	9	8	9	9	6	9	8	7
—	—	—	—	—	—	—	—	—	—

**B. Add. Time limit, from 5 to 6 $\frac{1}{4}$  minutes for 5 problems.**

1. 4552	2. 4236	3. 1378	4. 3246	5. 1358
2453	5264	2745	2187	3247
3204	3648	3739	4537	2496
5527	5064	7273	7885	1938
3216	6475	2584	9376	9495
—	—	—	—	—

6. 4258	7. 2069	8. 1677	9. 4284	10. 5645
2445	5524	2373	3246	2007
3557	6235	7024	3815	4934
2048	5667	3779	8089	9095
3427	7255	4493	7258	5678
—	—	—	—	—

**C. Add. Time limit, from 5 $\frac{1}{4}$  to 6 $\frac{1}{2}$  minutes for 5 problems.**

1. 355	2. 636	3. 724	4. 841	5. 137
452	643	447	322	292
305	255	233	189	292
424	606	377	358	939
354	365	374	380	432
205	366	707	408	699
438	659	626	856	958
—	—	—	—	—

6. 435 614 536 472 368 244 <u>323</u>	7. 541 306 272 328 154 329 <u>247</u>	8. 628 320 455 362 177 144 <u>324</u>	9. 317 288 364 379 648 201 <u>368</u>	10. 546 732 648 356 176 329 <u>475</u>
---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	---------------------------------------------------------	----------------------------------------------------------

D. Subtract. Time limit, 1 to  $1\frac{1}{4}$  minutes for 5 problems.

1. 1346 <u>475</u>	2. 1178 <u>435</u>	3. 1658 <u>790</u>	4. 1432 <u>867</u>	5. 1542 <u>764</u>
6. 1763 <u>985</u>	7. 1423 <u>790</u>	8. 1128 <u>742</u>	9. 1644 <u>889</u>	10. 1325 <u>687</u>
11. 1147 <u>498</u>	12. 1563 <u>678</u>	13. 1253 <u>345</u>	14. 1617 <u>748</u>	15. 1415 <u>829</u>

E. Subtract. Time limit,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  minutes for 5 problems.

1. 1500 <u>346</u>	2. 1000 <u>243</u>	3. 4006 <u>3217</u>	4. 8070 <u>1403</u>	5. 2103 <u>1037</u>
6. 1400 <u>274</u>	7. 6000 <u>2537</u>	8. 6003 <u>2147</u>	9. 7090 <u>2402</u>	10. 6014 <u>1026</u>
11. 1300 <u>723</u>	12. 8000 <u>5432</u>	13. 8007 <u>2949</u>	14. 6050 <u>4093</u>	15. 5205 <u>3008</u>
16. 1600 <u>924</u>	17. 9000 <u>2742</u>	18. 7005 <u>2498</u>	19. 9080 <u>7394</u>	20. 7012 <u>3047</u>

Multiply. Test each answer.

[Copy problems before timing.]

F. I.  $2\frac{1}{2}$  to 3 min. G. II. 5 to  $6\frac{1}{2}$  min. H. I. 7 to 9 min.

1.  $1328 \times 4$ . 1.  $218 \times 92$ . 1.  $2143 \times 201$ .

2.  $2189 \times 3$ . 2.  $267 \times 94$ . 2.  $1342 \times 402$ .

3.  $6907 \times 6$ . 3.  $546 \times 38$ . 3.  $3431 \times 306$ .

4.  $4807 \times 5$ . 4.  $873 \times 45$ . 4.  $4624 \times 407$ .

5.  $3099 \times 7$ . 5.  $674 \times 67$ . 5.  $2738 \times 508$ .

6.  $7067 \times 8$ . G. III. 5 to  $6\frac{1}{2}$  min. H. II.  $8\frac{1}{2}$  to 10 min.

7.  $1177 \times 9$ . 1.  $460 \times 82$ . 1.  $1632 \times 228$ .

8.  $1966 \times 2$ . 2.  $905 \times 76$ . 2.  $4354 \times 346$ .

9.  $4608 \times 7$ . 3.  $780 \times 69$ . 3.  $3187 \times 219$ .

10.  $8097 \times 3$ . 4.  $807 \times 94$ . 4.  $5679 \times 425$ .

5.  $890 \times 87$ . 5.  $2975 \times 167$ .

F. II.  $1\frac{1}{4}$  to  $1\frac{1}{2}$  min. G. IV.  $6\frac{1}{2}$  to  $8\frac{1}{2}$  min. I. I.  $3\frac{1}{2}$  to 5 min.

1.  $986 \times 40$ . 1.  $2140 \times 64$ . 1.  $\frac{2}{3} \times 372$ .

2.  $346 \times 90$ . 2.  $3860 \times 72$ . 2.  $\frac{3}{4} \times 864$ .

3.  $906 \times 80$ . 3.  $4078 \times 83$ . 3.  $\frac{3}{5} \times 4550$ .

4.  $765 \times 60$ . 4.  $6907 \times 91$ . 4.  $\frac{5}{6} \times 858$ .

5.  $979 \times 80$ . 5.  $5083 \times 75$ . 5.  $\frac{3}{8} \times 360$ .

G. I. 5 to  $6\frac{1}{2}$  min. G. V. 7 to 9 min. I. II.  $3\frac{1}{2}$  to 5 min.

1.  $234 \times 41$ . 1.  $3248 \times 29$ . 1.  $\frac{3}{4} \times 748$ .

2.  $617 \times 28$ . 2.  $5327 \times 62$ . 2.  $\frac{3}{5} \times 875$ .

3.  $119 \times 16$ . 3.  $7392 \times 38$ . 3.  $\frac{2}{3} \times 489$ .

4.  $922 \times 44$ . 4.  $2139 \times 47$ . 4.  $\frac{5}{8} \times 1280$ .

5.  $388 \times 57$ . 5.  $4928 \times 76$ . 5.  $\frac{7}{8} \times 1848$ .

Find quotients:

[Copy problems before timing.]

J. I. 5 to  $7\frac{1}{2}$  min.

1.  $4896 \div 6$ .
2.  $6363 \div 7$ .
3.  $5424 \div 8$ .
4.  $2934 \div 3$ .
5.  $7677 \div 9$ .
6.  $1854 \div 6$ .
7.  $1806 \div 7$ .
8.  $4224 \div 8$ .
9.  $3464 \div 4$ .
10.  $1584 \div 9$ .

K. I. 10 to  $12\frac{1}{2}$  min.

1.  $5544 \div 24$ .
2.  $13504 \div 32$ .
3.  $21443 \div 41$ .
4.  $51192 \div 81$ .
5.  $66332 \div 92$ .
6.  $58619 \div 73$ .
7.  $31164 \div 42$ .
8.  $44064 \div 72$ .
9.  $32064 \div 64$ .
10.  $49842 \div 54$ .

L. I. 10 to 15 min.

1.  $9692 \div 39$ .
  2.  $17520 \div 48$ .
  3.  $10203 \div 57$ .
  4.  $13137 \div 29$ .
  5.  $24396 \div 38$ .
- L. II. 10 to 15 min.
1.  $35767 \div 47$ .
  2.  $48970 \div 59$ .
  3.  $42364 \div 68$ .
  4.  $28756 \div 79$ .
  5.  $32208 \div 88$ .

J. II. 7 to 11 min.

1.  $17728 \div 4$ .
2.  $13842 \div 6$ .
3.  $29813 \div 7$ .
4.  $43368 \div 8$ .
5.  $66350 \div 5$ .
6.  $60534 \div 6$ .
7.  $67291 \div 7$ .
8.  $72536 \div 8$ .
9.  $14680 \div 4$ .
10.  $27216 \div 6$ .
11.  $38134 \div 9$ .

K. II. 11 to  $13\frac{3}{4}$  min.

1.  $16849 \div 83$ .
2.  $44641 \div 62$ .
3.  $37854 \div 54$ .
4.  $14723 \div 32$ .
5.  $12467 \div 62$ .
6.  $22496 \div 74$ .
7.  $11735 \div 51$ .
8.  $27040 \div 34$ .
9.  $36217 \div 72$ .
10.  $34037 \div 41$ .
11.  $31464 \div 92$ .

M. I. 5 to 7 min.

1.  $19642 \div 322$ .
  2.  $21476 \div 413$ .
  3.  $23232 \div 704$ .
  4.  $73350 \div 815$ .
  5.  $22924 \div 521$ .
- M. II. 10 to 15 min.
1.  $137052 \div 324$ .
  2.  $336582 \div 621$ .
  3.  $264350 \div 425$ .
  4.  $183008 \div 532$ .

Find sums and differences:

N.

O.

- |                                    |                                    |                                     |                                     |
|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| 1. $2\frac{1}{2} + \frac{1}{2}$ .  | 9. $2\frac{1}{2} + \frac{1}{4}$ .  | 1. $12\frac{1}{2} - 4$ .            | 9. $4\frac{1}{2} - \frac{1}{4}$ .   |
| 2. $3\frac{1}{2} + 1\frac{1}{2}$ . | 10. $1\frac{1}{2} + \frac{1}{8}$ . | 2. $14\frac{1}{2} - 4\frac{1}{2}$ . | 10. $8\frac{3}{4} - \frac{1}{2}$ .  |
| 3. $6\frac{3}{4} + \frac{1}{4}$ .  | 11. $5\frac{1}{2} + \frac{3}{8}$ . | 3. $8\frac{3}{4} - \frac{1}{4}$ .   | 11. $7\frac{1}{2} - \frac{1}{8}$ .  |
| 4. $6\frac{3}{4} + 1\frac{1}{4}$ . | 12. $4\frac{1}{4} + \frac{1}{8}$ . | 4. $5\frac{3}{4} - 2\frac{1}{4}$ .  | 12. $6\frac{1}{2} - \frac{3}{8}$ .  |
| 5. $3\frac{3}{4} + 3\frac{1}{4}$ . | 13. $2\frac{1}{4} + \frac{3}{8}$ . | 5. $4\frac{5}{8} - \frac{1}{8}$ .   | 13. $5\frac{1}{4} - \frac{1}{8}$ .  |
| 6. $5\frac{1}{4} + \frac{1}{4}$ .  | 14. $3\frac{1}{4} + \frac{5}{8}$ . | 6. $6\frac{7}{8} - \frac{1}{8}$ .   | 14. $7\frac{3}{4} - \frac{1}{8}$ .  |
| 7. $5\frac{1}{4} + 3\frac{1}{4}$ . | 15. $1\frac{3}{4} + \frac{1}{8}$ . | 7. $7\frac{7}{8} - 3$ .             | 15. $5\frac{3}{4} - 1\frac{1}{8}$ . |
| 8. $7\frac{1}{4} + 2\frac{1}{4}$ . |                                    | 8. $7\frac{7}{8} - 3\frac{1}{8}$ .  |                                     |

## 82. Progress Score

These are tests or "examinations" by which you may measure your year's work in arithmetic. Try to make 100 points on each of the four tests counting for each correct answer the score given below the letter of the problem.

[Write answers on the folds of a paper.]

I. Add, testing each sum:

- |                                       |                                       |                                       |                                       |           |          |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-----------|----------|
| A. 57                                 | B. 40                                 | C. 38                                 | K. 5                                  | L. 74     | M. 343   |
| (3) <u>32</u>                         | (3) <u>58</u>                         | (4) <u>27</u>                         | (7) 6                                 | (10) 56   | (10) 541 |
|                                       |                                       |                                       | 7                                     | 28        | 678      |
| D. 67                                 | E. \$6.75                             | F. \$.98                              | 5                                     | 94        | 463      |
| (5) 49                                | (8) 5.84                              | (10) .78                              | 7                                     | 65        | 276      |
| <u>56</u>                             | <u>6.68</u>                           | <u>.59</u>                            | 8                                     | 49        | 787      |
|                                       |                                       |                                       | 6                                     | 93        | 438      |
| G. $3\frac{1}{2}$                     | H. $5\frac{3}{4}$                     | I. $6\frac{1}{2}$                     | J. $4\frac{1}{8}$                     |           |          |
| (10) <u><math>4\frac{1}{2}</math></u> | (10) <u><math>4\frac{1}{4}</math></u> | (10) <u><math>5\frac{1}{4}</math></u> | (10) <u><math>2\frac{1}{2}</math></u> |           |          |
|                                       |                                       |                                       | 9                                     | <u>49</u> |          |
|                                       |                                       |                                       | 8                                     |           |          |



## II. Subtract, testing each difference:

A.  $\begin{array}{r} 48 \\ (3) \underline{13} \end{array}$

B.  $\begin{array}{r} 59 \\ (3) \underline{40} \end{array}$

C.  $\begin{array}{r} 34 \\ (4) \underline{9} \end{array}$

D.  $\begin{array}{r} 52 \\ (4) \underline{28} \end{array}$

E.  $\begin{array}{r} 727 \\ (5) \underline{143} \end{array}$

F.  $\begin{array}{r} 542 \\ (5) \underline{197} \end{array}$

G.  $\begin{array}{r} 3000 \\ (7) \underline{2142} \end{array}$

H.  $\begin{array}{r} 13742 \\ (9) \underline{7280} \end{array}$

I.  $\begin{array}{r} \$4.50 \\ (8) \underline{2.17} \end{array}$

J.  $\begin{array}{r} \$50.00 \\ (10) \underline{12.38} \end{array}$

K.  $\begin{array}{r} 24\frac{1}{2} \\ (5) \underline{8} \end{array}$

L.  $\begin{array}{r} 8\frac{3}{4} \\ (5) \underline{2\frac{1}{4}} \end{array}$

M.  $\begin{array}{r} 6\frac{3}{4} \\ (10) \underline{2\frac{1}{2}} \end{array}$

N.  $\begin{array}{r} 7\frac{5}{8} \\ (10) \underline{2\frac{1}{2}} \end{array}$

O.  $\begin{array}{r} 9\frac{7}{8} \\ (12) \underline{2\frac{1}{4}} \end{array}$

## III. Multiply, testing each product:

[Copy problems.]

A.  $\begin{array}{r} 32 \\ (3) \underline{3} \end{array}$

B.  $\begin{array}{r} 60 \\ (4) \underline{4} \end{array}$

C.  $\begin{array}{r} 76 \\ (5) \underline{3} \end{array}$

D.  $\begin{array}{r} 1478 \\ (7) \underline{6} \end{array}$

E.  $\begin{array}{r} \$3.89 \\ (7) \underline{9} \end{array}$

F.  $\begin{array}{r} 48 \\ (7) \underline{700} \end{array}$

G.  $\begin{array}{r} 675 \\ (12) \underline{68} \end{array}$

H.  $\begin{array}{r} 1302 \\ (15) \underline{157} \end{array}$

I.  $\begin{array}{r} 4269 \\ (15) \underline{204} \end{array}$

J.  $\frac{1}{2}$  of \$15.00 = ?  
(10)

K.  $\frac{5}{8} \times \$75.20 = ?$   
(15)

## IV. Divide, testing each quotient:

A.  $\begin{array}{r} 2 \overline{)86} \\ (3) \end{array}$

B.  $\begin{array}{r} 3 \overline{)150} \\ (3) \end{array}$

C.  $\begin{array}{r} 2 \overline{)72} \\ (5) \end{array}$

D.  $\begin{array}{r} 4 \overline{)176} \\ (5) \end{array}$

E.  $\begin{array}{r} 8 \overline{)832} \\ (7) \end{array}$

F.  $\begin{array}{r} 7 \overline{)214} \\ (8) \end{array}$

G.  $\begin{array}{r} 6 \overline{)3948} \\ (7) \end{array}$

H.  $\begin{array}{r} 9 \overline{)78869} \\ (10) \end{array}$

I.  $\begin{array}{r} 6 \overline{)\$42.36} \\ (10) \end{array}$

J.  $\begin{array}{r} 81 \overline{)34992} \\ (8) \end{array}$

K.  $\begin{array}{r} 48 \overline{)29136} \\ (12) \end{array}$

L.  $\begin{array}{r} 21 \overline{)\$152.25} \\ (10) \end{array}$

M.  $\begin{array}{r} 321 \overline{)237540} \\ (12) \end{array}$

## TABLES

## LENGTH

12 inches (in.) = 1 foot (ft.).

3 feet = 1 yard (yd.).

$16\frac{1}{2}$  feet = 1 rod (rd.).

5,280 feet, or 320 rods = 1 mile (mi.).

## SQUARE MEASURE

144 square inches (sq. in.) = 1 square foot (sq. ft.).

9 square feet = 1 square yard (sq. yd.).

160 square rods (sq. rd.) = 1 acre (A.).

## LIQUID MEASURE

4 gills (gi.) = 1 pint (pt.).

2 pints = 1 quart (qt.).

4 quarts = 1 gallon (gal.).

## DRY MEASURE

2 pints (pt.) = 1 quart (qt.).

8 quarts = 1 peck (pk.).

4 pecks = 1 bushel (bu.).

## WEIGHT

16 ounces (oz.) = 1 pound (lb.).

100 pounds = 1 hundredweight (cwt.).

2,000 pounds = 1 ton (T.).

## TIME

60 seconds (sec.) = 1 minute (min.).

60 minutes = 1 hour (hr.).

24 hours = 1 day (da.).

7 days = 1 week (wk.).

365 days = 1 common year (yr.).

<sup>1</sup>366 days = 1 leap year.

<sup>1</sup> Other equivalents for 1 year are: 52 weeks; 13 lunar months of 4 weeks each; 12 calendar months containing 30 or 31 days each (except February).

## Multiplication Tables

$1 \times 1 = 1$	$1 \times 2 = 2$	$1 \times 3 = 3$	$1 \times 4 = 4$
$2 \times 1 = 2$	$2 \times 2 = 4$	$2 \times 3 = 6$	$2 \times 4 = 8$
$3 \times 1 = 3$	$3 \times 2 = 6$	$3 \times 3 = 9$	$3 \times 4 = 12$
$4 \times 1 = 4$	$4 \times 2 = 8$	$4 \times 3 = 12$	$4 \times 4 = 16$
$5 \times 1 = 5$	$5 \times 2 = 10$	$5 \times 3 = 15$	$5 \times 4 = 20$
$6 \times 1 = 6$	$6 \times 2 = 12$	$6 \times 3 = 18$	$6 \times 4 = 24$
$7 \times 1 = 7$	$7 \times 2 = 14$	$7 \times 3 = 21$	$7 \times 4 = 28$
$8 \times 1 = 8$	$8 \times 2 = 16$	$8 \times 3 = 24$	$8 \times 4 = 32$
$9 \times 1 = 9$	$9 \times 2 = 18$	$9 \times 3 = 27$	$9 \times 4 = 36$
$10 \times 1 = 10$	$10 \times 2 = 20$	$10 \times 3 = 30$	$10 \times 4 = 40$
$11 \times 1 = 11$	$11 \times 2 = 22$	$11 \times 3 = 33$	$11 \times 4 = 44$
$12 \times 1 = 12$	$12 \times 2 = 24$	$12 \times 3 = 36$	$12 \times 4 = 48$

$1 \times 5 = 5$	$1 \times 6 = 6$	$1 \times 7 = 7$	$1 \times 8 = 8$
$2 \times 5 = 10$	$2 \times 6 = 12$	$2 \times 7 = 14$	$2 \times 8 = 16$
$3 \times 5 = 15$	$3 \times 6 = 18$	$3 \times 7 = 21$	$3 \times 8 = 24$
$4 \times 5 = 20$	$4 \times 6 = 24$	$4 \times 7 = 28$	$4 \times 8 = 32$
$5 \times 5 = 25$	$5 \times 6 = 30$	$5 \times 7 = 35$	$5 \times 8 = 40$
$6 \times 5 = 30$	$6 \times 6 = 36$	$6 \times 7 = 42$	$6 \times 8 = 48$
$7 \times 5 = 35$	$7 \times 6 = 42$	$7 \times 7 = 49$	$7 \times 8 = 56$
$8 \times 5 = 40$	$8 \times 6 = 48$	$8 \times 7 = 56$	$8 \times 8 = 64$
$9 \times 5 = 45$	$9 \times 6 = 54$	$9 \times 7 = 63$	$9 \times 8 = 72$
$10 \times 5 = 50$	$10 \times 6 = 60$	$10 \times 7 = 70$	$10 \times 8 = 80$
$11 \times 5 = 55$	$11 \times 6 = 66$	$11 \times 7 = 77$	$11 \times 8 = 88$
$12 \times 5 = 60$	$12 \times 6 = 72$	$12 \times 7 = 84$	$12 \times 8 = 96$

$1 \times 9 = 9$	$1 \times 10 = 10$	$1 \times 11 = 11$	$1 \times 12 = 12$
$2 \times 9 = 18$	$2 \times 10 = 20$	$2 \times 11 = 22$	$2 \times 12 = 24$
$3 \times 9 = 27$	$3 \times 10 = 30$	$3 \times 11 = 33$	$3 \times 12 = 36$
$4 \times 9 = 36$	$4 \times 10 = 40$	$4 \times 11 = 44$	$4 \times 12 = 48$
$5 \times 9 = 45$	$5 \times 10 = 50$	$5 \times 11 = 55$	$5 \times 12 = 60$
$6 \times 9 = 54$	$6 \times 10 = 60$	$6 \times 11 = 66$	$6 \times 12 = 72$
$7 \times 9 = 63$	$7 \times 10 = 70$	$7 \times 11 = 77$	$7 \times 12 = 84$
$8 \times 9 = 72$	$8 \times 10 = 80$	$8 \times 11 = 88$	$8 \times 12 = 96$
$9 \times 9 = 81$	$9 \times 10 = 90$	$9 \times 11 = 99$	$9 \times 12 = 108$
$10 \times 9 = 90$	$10 \times 10 = 100$	$10 \times 11 = 110$	$10 \times 12 = 120$
$11 \times 9 = 99$	$11 \times 10 = 110$	$11 \times 11 = 121$	$11 \times 12 = 132$
$12 \times 9 = 108$	$12 \times 10 = 120$	$12 \times 11 = 132$	$12 \times 12 = 144$

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