THE STONE-MILLIS ARITHMETIC

PRIMARY
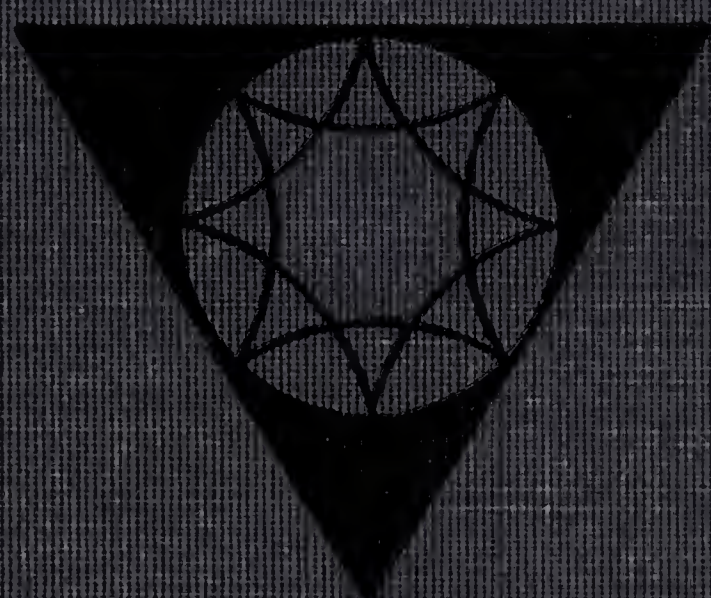
THE
STONE-MILLIS ARITHMETICS
PRIMARY

BY

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οὐ πόλλ' ἀλλὰ πολύ
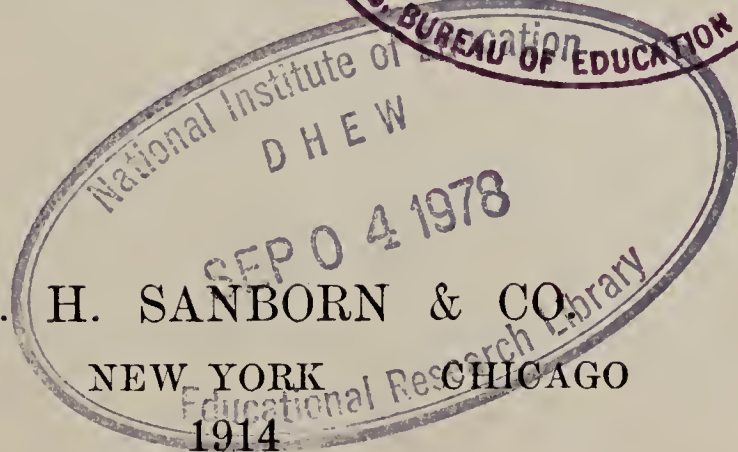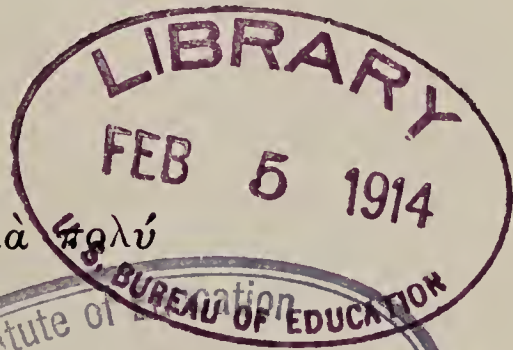
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PREFACE

In the preparation of this series of arithmetics the chief aims have been more adequately to adapt the subject matter to the experiences, interests, and immediate needs of children, and to provide means for a mastery of the formal phases of arithmetic through more scientifically organized drills.

The books are based upon the principles that knowledge to be real must be founded upon the actual experiences of the individual learner; that knowledge to be retained must be given opportunity for use, the more immediately the better; and that a necessary condition for true learning is that the process be self-actuated through motive or interest.

Hence, throughout the series an endeavor has been made not only to develop the principles and processes in a most economical and psychological order but to provide an adequate mental imagery as a basis for their rational understanding.

In the selection of problem material the utmost care has been exercised to use only problems that deal with the experiences of children. They deal with their chief occupation — play, with their constructive activities, with phases of the home and the local community life with which they come into direct contact. The problems of adult life, of interest only to adults, who have had a wider experience and in consequence interests foreign to the lives of children, have been painstakingly excluded from the lower grades. Many pages

of problems are grouped to tell a story, and they teach lessons valuable in themselves. Many are based upon and portray actual facts, as given in statistics, etc. By using problems touching the actual experiences of childhood we are assured of adequate imagery in the child's mind, upon which his success in the interpretation and solution of problems most depends. Such problems also provide opportunity for the pupil's arithmetical knowledge to function through use, for they give practice in solving the very problems which children actually encounter in their activities in and out of school. Evidently such problems furnish the maximum of motive or interest, the prerequisite for self-actuated study. This feature of the Stone-Millis Arithmetics manifests itself conspicuously throughout the series.

The play instinct has been appealed to throughout the series, especially in the work of the primary grades. In the work of the second and third grades numerous games have been introduced that have been found, by actual use in the classrooms of many schools, to be of deep interest to children. These provide an excellent basis of problems and a means for motivated drills.

Most of the commercial applications of arithmetic are foreign to the experiences of children. In order to provide in the school the experiences that are otherwise lacking, and that are necessary for the mastery of this phase of arithmetic, suggestions have been given at different points of the series showing how the business processes may be dramatized or acted out in make-believe activities in the schoolroom.

Motivated drills, for the mastery of the tables and formal processes of arithmetic, have been systematically and plentifully provided throughout the books, and should prove a strong feature of the series. The game element has been

introduced frequently in these drills, especially for the primary grades.

The series consists of three books: the *Primary*, *Intermediate*, and *Advanced*. The *Primary* book contains the work suggested for the second, third, and fourth grades; the *Intermediate*, the work for the fifth and sixth grades; and the *Advanced*, the work for the seventh and eighth grades.

In the preparation of this second edition, the authors have had the assistance of many teachers and educators, who have read the manuscript and proof critically and have offered valued constructive suggestions.

They are especially indebted to Supt. L. P. Benezet of La Crosse, Wisconsin, and to Supt. Don C. Bliss of Montclair, New Jersey, and to their corps of principals and teachers, to all of whom they wish to acknowledge their deepest gratitude.

JOHN C. STONE,
JAMES F. MILLIS.

January, 1914.

SUGGESTIONS TO TEACHERS

In using these books, the best results will be obtained by following carefully the order and method of development of topics in the text. There is a most economical and psychological, as well as logical, order of steps in the development of each of the formal processes, and they must be thoroughly developed and rationalized in the mind of every pupil. A thorough understanding of each process necessitates that underlying it there be built up in the mind of the pupil a clear body of imagery. Part of this imagery is developed through objective teaching, and part is mere picturing of the form of the process — keeping numbers in straight columns, etc. The text suggests many ways of providing this imagery through the use of objects, etc. Other objective means of providing adequate mental imagery will suggest themselves to the thinking teacher who fully grasps the principle involved. Do not continue with the concrete aids after their object is once attained, *i.e.* after making clear the meaning of the fact or process. Each formal process should become to the pupil a machine. Automatic control of this machine as such should be the ultimate aim. For this purpose much drill work is necessary. Supplement the drills of the text by cards, charts, games, etc.

In the solution of an applied problem, the essential thing is to see that there is a clear mental picture in each pupil's mind

of the situation involved in the problem. The reason that problems are hard, and that pupils fail with them, is because the mental imagery is not provided. It is wise, before sending pupils home to get a lesson, to see that every pupil in the class possesses adequate imagery for the interpretation of each problem in the lesson. This is the most essential thing in successful teaching.

If the problems used are only those that come within the range of the child's actual experiences and activities, the imagery required for their interpretation is apt to be possessed by the pupils. It is when we use problems from the world of adults, dealing with matter with which children have had no experience, that we ask the impossible of the pupils. The problems of this text deal, in so far as it is possible, with the experiences of childhood, yet some children in every class may be lacking in the particular imagery that is necessary for the interpretation of some of the problems. This the teacher must take care to supply.

The problems of the text should be supplemented in every community by the use of local problems drawn from the environment of the pupils. Apply every topic to problems which the pupils meet in their other school work, and in their own everyday lives in the home and in the larger community. The teacher and pupils together should collect the data for these problems. If in a rural school, where agriculture is taught, draw upon that subject for problems — the testing of seeds for planting, etc. Strive to make arithmetic a practical tool in the solution of the pupil's own personal problems.

In the text, problems have not been labeled "oral" or "written," an invariable custom among other books. We prefer, rather, that the pupil be encouraged to solve every problem as far as possible without a pencil, as in real life.

It is believed that such a procedure will tend toward a more spontaneous method of analysis, and hence lead away from the mechanical and deadening forms so often seen in the schoolroom.

Neither have many set forms of solution been given in the text. In most cases the teacher should not demand any particular form, but should encourage a pupil to study each problem and choose the method that seems to him to require the least figuring. Encourage short methods. Do not repress originality or individuality.

The play instinct of children should be utilized in the teaching of arithmetic, by the use of games in the primary grades, and by contests and dramatizations in the higher grades. Various types of games for the primary grades are suggested in the text. They afford motivated drills on the tables and processes. These games will suggest others that the teacher may invent. Some are well adapted for use by a large class in the classroom, some are suited for smaller groups of children, and some are good for two or more children to play at home. In the upper grades children enjoy drills in the form of contests or "number downs," where the class is divided into two opposing teams.

The dramatization of the commercial applications of arithmetic has been tried with remarkable success in many schools. Suggestions as to how this may be carried out are given at several points of the text. The pupils organize and "go through the motions" of a make-believe business, using real business forms and processes. This work makes the commercial processes realistic, appeals to the play instinct, utilizes the social motive, affords immediate applications of the arithmetic work, and applies the principle of learning to do by doing. Most of this activity may be carried on outside the regular

school hours, and only the checking up, summaries, and drills need consume the recitation time.

The tables of drills given throughout the text should be used carefully by teachers. Many are printed in script because of a number of evident advantages. Some of these tables, as those on pages 219, 220, and 221 of the Primary book, should be used for a short time each day, for several days in succession. In the use of such tables use a time limit, encouraging the pupils to work rapidly and accurately. Have the pupils score their results each day, as suggested in the text, and keep their scores for several days. They will thus be able to measure and observe their own progress from day to day, and will try to improve their records. Teachers who understand the graphing of statistics might show the pupils how to picture their progress by means of graphs of their daily scores. These drill tables, involving contest and the game element, have been used in this way with unbounded interest on the part of the pupils, and with gratifying results.

CONTENTS

PART ONE: SECOND YEAR

PART TWO: THIRD YEAR

PART THREE: FOURTH YEAR

PRIMARY ARITHMETIC

PART ONE: SECOND YEAR

COUNTING

1. Two boys and one boy are how many boys?
2. Two boys and two boys are how many boys?
3. Two boys and three boys are how many boys?
4. Take one boy from three boys.   How many remain?
5. Take one boy from four boys.   How many remain?

6. Take one ball from five balls.   How many balls are left?

7. Take two balls from five balls.   How many balls are left?

8. Three balls taken from five balls leave how many?

1

1 apple   2 apples   3 apples   4 apples   5 apples
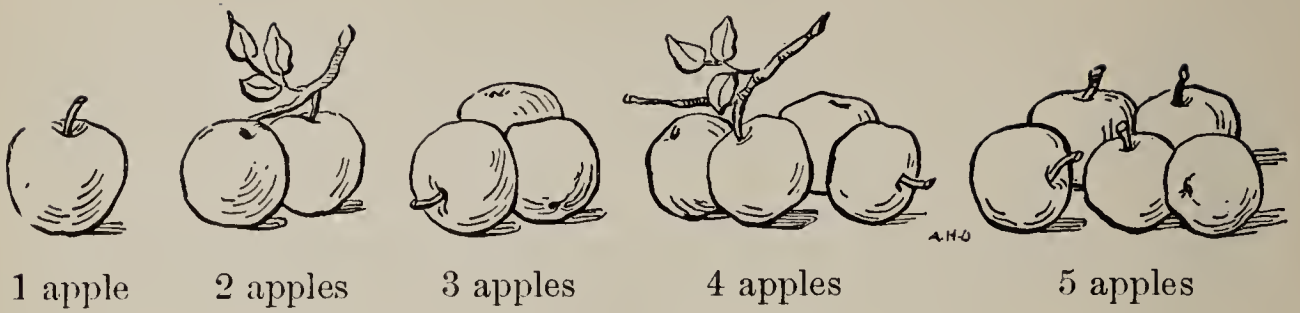
1. Make the figures that mean *one, two, three, four,* and *five.*

2. Tell how many:

3   4   4   5   5
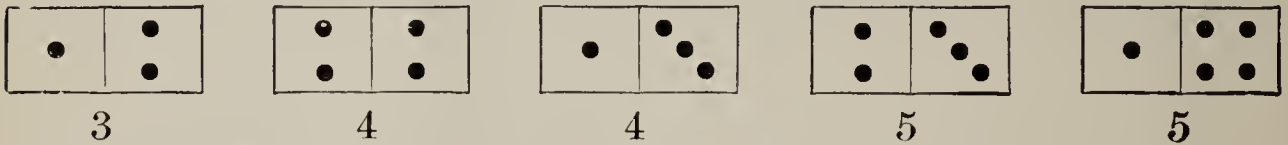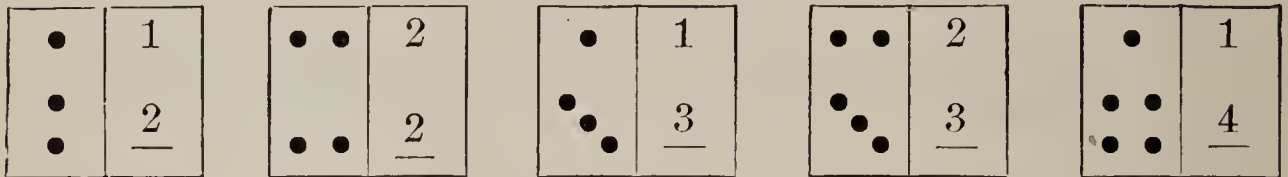
3. One taken from three leaves how many?

4. One taken from four leaves how many?

5. 2 taken from 4 leaves how many?

6. 2 taken from 5 leaves how many?

7. If I take 1 from 5, how many are left?

8. If I take 3 from 5, how many are left?

9. If I take 3 from 4, how many are left?

NOTE. — An excellent device for drills is to make cards with the dots and figures on one side, and the figures only on the other side. The drill should continue until the pupils can tell the combinations instantly when seeing figures only.

1 inch

—— inches

—— inches

—— inches

NOTE. — Provide splints of these lengths.

1. 2 inches and 1 inch are —— inches.

2. 3 inches and 2 inches are —— inches.

3. 1 inch and 4 inches are —— inches.

4. 2 inches and 2 inches are —— inches.

5. 2 inches cut from a line 4 inches long will leave a line —— inches long.

6. 2 taken from 4 leaves how many?

7. 4 less 2 means that 2 is taken from 4. 4 less 2 are how many?

8. 5 inches less 1 inch are —— inches.

9. 4 inches less 3 inches are —— inch.

10. Mary has a pencil 4 inches long. It will make 2 equal pencils, each —— inches long.

11. John has a pencil 5 inches long. It will make a pencil 2 inches long, and another —— inches long.

NOTE. — See that pupils understand and can use both expressions, 2 from 4, and 4 less 2.

Note. — Have pupils see that in counting they are adding one each time.
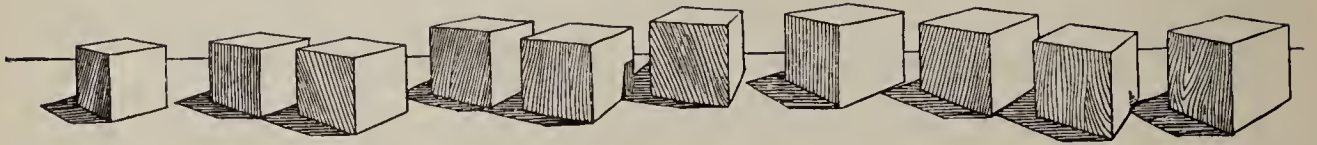
1. These are **cubes**. Count them.

2. Put ten cubes into a box and count them as you put them in. How many did you put into the box each time you counted?

six	seven	eight	nine	ten
6	7	8	9	10

3. Tell how many in each group:

6	4	7	3	8	2	9	5
1	1	1	1	1	1	1	1

Note. — Have pupils add these by counting one from the larger. Thus, they should think, " 6, 7 " ; " 4, 5 " ; etc.

4. Henry had 6 cents and earned 1 cent more. How many cents had he then?

5. There were 7 apples on one branch. May picked 1 apple. How many were left?

6. 8 oranges and 1 orange are —— oranges.

7. 5 apples and 1 apple are —— apples.

8. Make stories about the cubes in the picture.

1. These children are going to have a birthday dinner. There are to be 4 children at the table. There are 2 spoons at each plate. Count them by 2's, touching 2 spoons each time you count. Say 2, 4, 6, 8.

2. How many are 2 and 2? How many are 4 and 2?

3. Count the children by 2's.

4. Tell how many:

$$\begin{array}{c} 2 \\ \underline{2} \end{array} \qquad \begin{array}{c} 4 \\ \underline{2} \end{array} \qquad \begin{array}{c} 6 \\ \underline{2} \end{array} \qquad \begin{array}{c} 3 \\ \underline{3} \end{array}$$
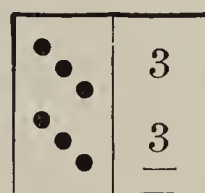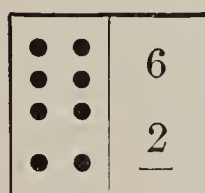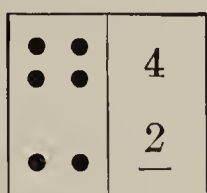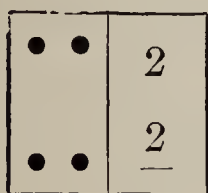
5. There are 2 boys in the picture. How many girls?

6. 4 and 2 are how many? 6 less 2 are how many?

7. Henry, who is carrying the cake, is 2 years younger than his sister. She is 8 years old. How old is Henry?

8. John is 2 years younger than Henry. How old is John?
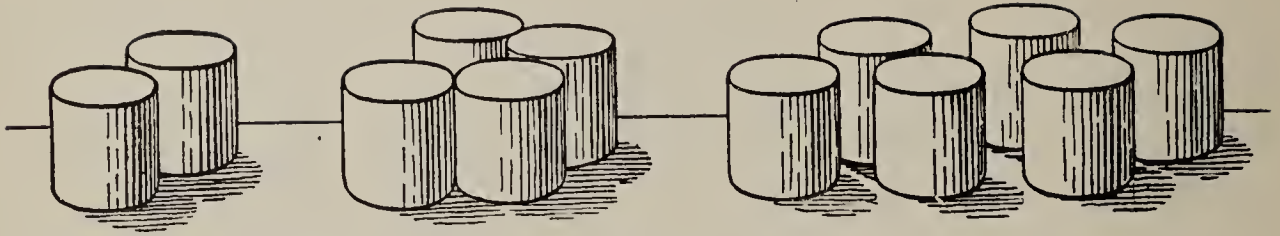
1. These are **cylinders**. Count them by 2's. As you touch each group say 2, 4, 6.

2. Count rapidly by 2's from 2 to 10. Count from 10 to 2.

2	4	6	8	10
2	2 and 2	4 and 2	6 and 2	8 and 2

3. Tell how many in each group:

$$\begin{array}{cccc} 2 & 2 & 2 & 2 \\ \underline{2} & \underline{4} & \underline{6} & \underline{8} \end{array}$$
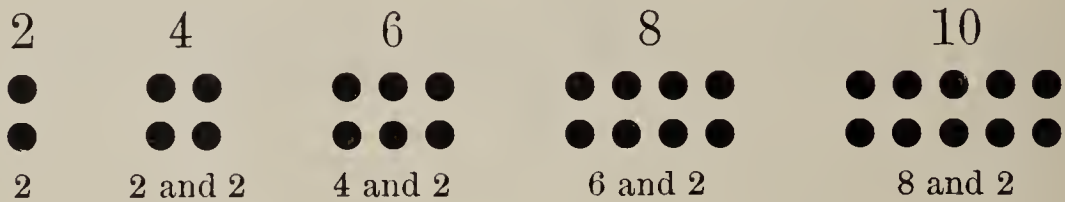
4. If Henry had 2 cents and earned 2 cents more, how many would he then have?

5. Make problems about 2 apples and 4 apples.

6. Make problems about 2 boys and 6 boys.

7. Make problems about 2 inches and 8 inches.

8. Mary had 6 cents and spent 2 cents. How many were left?

9. If you had 8 apples and should give **away 2 of** them, how many would you then have?
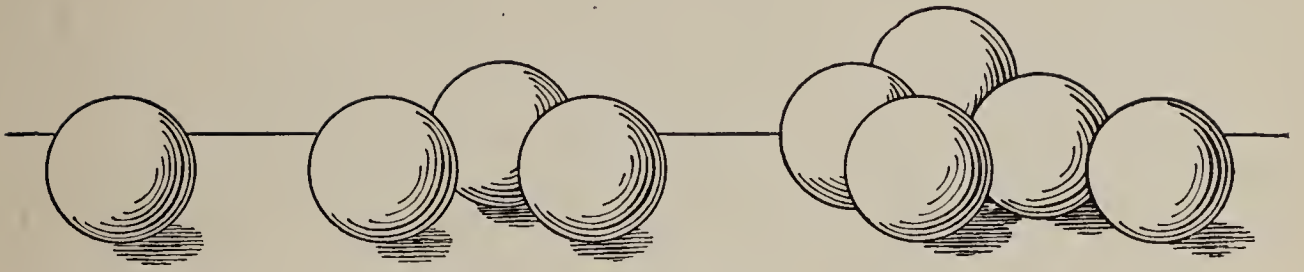
1. These are **spheres**. Count them by 2's. As you touch each group say 1, 3, 5.

2. Count rapidly by 2's from 1 to 9. Count from 9 to 1.

3. Tell how many :

1	3	2	7
2	2	5	2
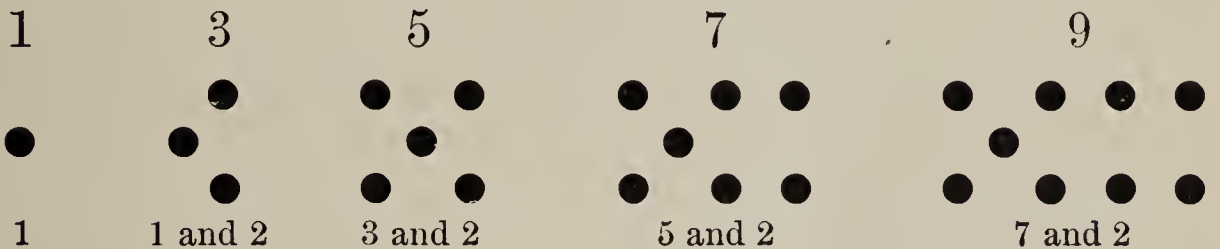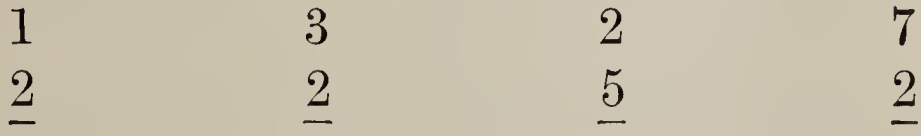
4. John had 3 cents and earned 2 cents more. He then had —— cents.

5. Mary had 7 cents and spent 2 cents for a pencil. She had —— cents left.

6. Make a problem about 2 apples and 8 apples.

7. Make a problem about 8 inches less 2 inches.

8. If you take 3 spheres away from 5 spheres, how many will be left?

> *To* **add** *two numbers is to put them together to form one number.   The number formed is the* **sum.**

3	4	1	5	8	7	1
2	1	6	1	1	1	9

1. When I *add* 2 and 1, I have 3.   3 is the *sum* of —— and ——.

2. Look at the groups above and say, " the sum of 3 and 2 is 5, the sum of 4 and 1 is ——," until you have given the sum of every group.

3. Add quickly:

2	3	2	2	2	6	4
2	2	5	8	7	2	2

4. Copy the groups given above and write the sum below each.

5. The number below the line in each group is the *sum.* Tell the missing number to take the place of the star:

3	*	4	2	*	2	*	*
*	2	*	*	4	*	8	7
5	4	5	3	6	7	10	8

*	2	*	*	2	*	7	*
5	*	2	2	*	9	*	6
7	5	6	8	10	10	9	7

3 and 3   3 and 4   4 and 4

1. How many cherries are 3 cherries and 3 cherries?
2. How many are 3 pears and 4 pears?
3. How many are 4 oranges and 4 oranges?

5   and   5

4. How many are 5 apples and 5 apples?
5. How many 3's in 6?   6. How many 4's in 8?
7. How many 5's in 10?
8. Add:
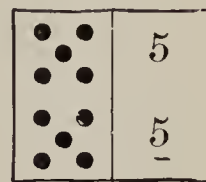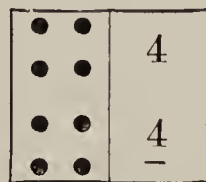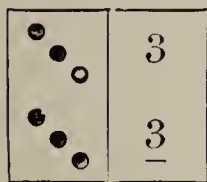
9. Tell the missing number:

$$\frac{*}{\underset{6}{3}} \quad \frac{*}{\underset{7}{3}} \quad \frac{3}{\underset{*}{4}} \quad \frac{*}{\underset{8}{4}} \quad \frac{4}{\underset{7}{*}} \quad \frac{4}{\underset{*}{4}} \quad \frac{*}{\underset{10}{5}} \quad \frac{3}{\underset{*}{3}} \quad \frac{5}{\underset{*}{5}}$$

" London Bridge is falling Down ! "

1. How many children have their hands joined to form the bridge ?

2. How many are there passing under? How many are 2 and 8 ?

3. How many have passed under? How many more to pass under ? Three and 5 are how many ?

4. Think what each figure means and add :

3	6	7	6	4
5	2	3	3	5

$4 + 5 = 9$ *is a short way to write 4 and 5 are 9.*

5. Read these :

$4 + 3 = 7$	$3 + 3 = 6$	$8 + 2 = 10$	$3 + 5 = 8$
$5 + 5 = 10$	$4 + 5 = 9$	$3 + 6 = 9$	$7 + 3 = 10$

"Playing Firemen"

NOTE. — Let the teacher time each pupil as he climbs the ladder by calling the combinations. If he calls one wrong, play that he fell off in going up the ladder. Then let some one else try. Let the one that fell off try again later. Children usually like this game.

1. These children are playing firemen. Which one will get to the top first?

Beginning at the bottom, see how long it takes to go to the top of each ladder.

2. See how long it will take you to run up one ladder and down the other.

3. Make a table of the 25 sums you have learned. Thus

$$2+2=4$$
$$2+3=5$$
$$2+4=6$$

And so on.
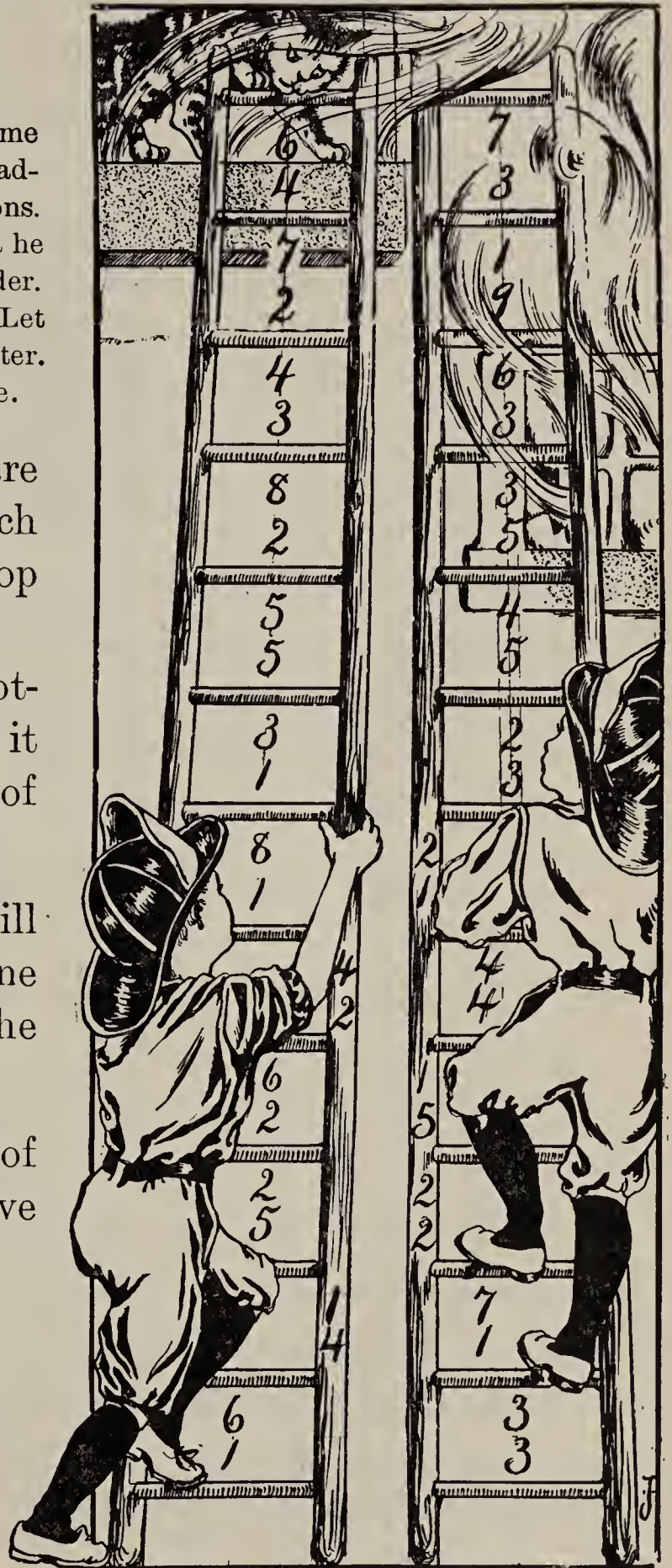
"Simon says Thumbs Up"

1. These children are playing a number game. The one standing before the class is showing number cards. The one back of the table is giving the *sums*. When she makes a mistake, all thumbs must turn down. The first one to turn down the thumbs then shows the cards, while the last one to turn thumbs down stands to give the sums. Would you like to play this game?

Learn to give the sums quickly, and then make some cards. They are:

2	6	5	3	2	3	2	4	1	7	3	6
1	3	5	3	6	1	3	4	8	2	5	1

4	5	1	2	5	7	5	3	5	2	8	1
6	1	7	2	4	3	2	4	1	4	2	9

2. Above there are 24 sums to be given. See how quickly you can give them all.

3. Write the 24 sums in this way, $6 + 3 = 9$.

NOTE. — This game may be used in drilling upon any of the combinations. The authors have found it an excellent device.

1. Mary has blown 5 soap bubbles and Henry 4. Together they have blown ——.

2. If Henry and Mary had blown 5 bubbles each, together they would have blown how many?

3. The pipes they are using cost 4 cents each. How much did the two cost?

4. If they gave 8 cents for the pipes, how much change did they get from 10 cents?

5. If Mary has blown 6 bubbles, how many more must she blow to make 10?

6. Henry has blown 9, but 4 have fallen and burst. How many are left?

7. When Henry has blown 8 bubbles, how many more will be needed to make 10?

8. Make problems about 2 bubbles and 6 bubbles.

9. Make problems about 3 cents and 6 cents.

10. Make problems about 8 bubbles less 3 bubbles.

11. Make problems about 4 boys and 5 boys.

12. Make problems about 7 cents less 3 cents.

NOTE. — Use drill cards, or some of the games, daily.

"Pussy Wants a Corner"

1. These children are playing a game. They are given numbers not larger than 10. Two children have the same number. The one in the center calls two numbers whose sum is not larger than 10. If she calls 2 and 5, the two children who have the number 7 exchange places. The one in the center tries to get one of the places when they are exchanging. Would you like to play this game? To play it well you must give quickly:

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

NOTE. — This table gives practice in giving combinations when the figures are not seen in column form. The game furnishes drill in giving sums from hearing the numbers. In drill work appeal to the ear as well as the eye.
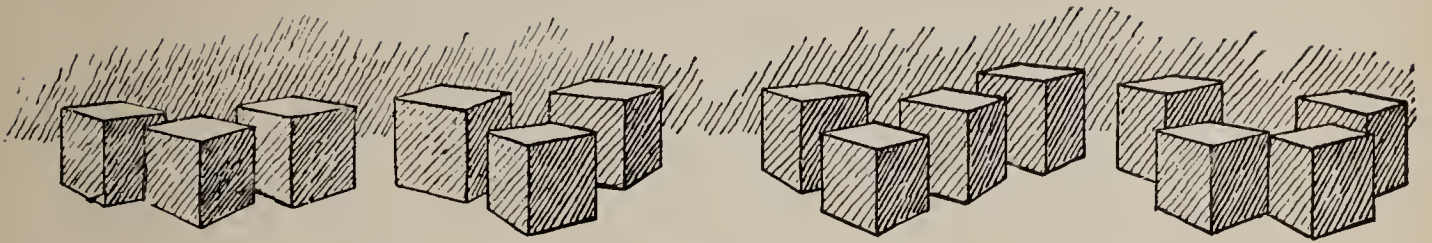
1. If I take three cubes from six cubes, how many cubes have I left?

2. If I take 4 from 8, how many have I left?

3. 2 from 6 leaves how many?

4. 5 from 10 leaves how many?
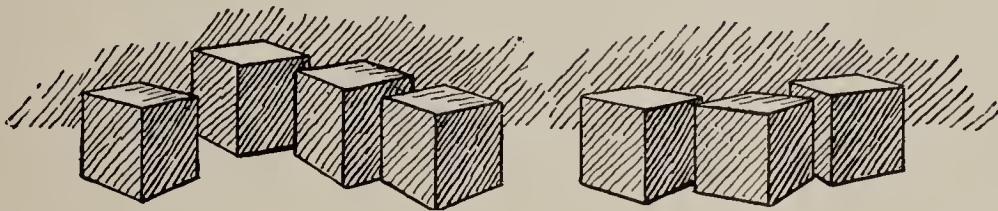
5. 4 and 3 are how many? Then if I take 3 from 7, how many are left?

6. If I take 4 from 7, how many are left?

7. 6 and 3 are how many? Then 3 from 9 leaves how many? 6 from 9 leaves how many?

8. 9 less 6 are how many?

9. Take 1 from each of the numbers from 2 to 10.

10. Take 2 from each of the numbers from 3 to 10.

11. Take 3 from each of the numbers from 4 to 10.

Note. — Show the pupil how subtraction comes from addition. Thus, since 3 and 5 are 8, 3 from 8 must leave 5, and 5 from 8 leaves 3.

1. How many in the sum of each group?

3	5	6	8	3	7	3	4	4	2
4	1	2	1	6	2	5	4	5	4

2. 7 less 4 are how many?   3. 7 less 3 are how many?

4. 8 less 2 are how many?   5. 8 less 6 are how many?

$10 - 6 = 4$ *is read* 10 *less* 6 *are* 4.   *This means that* 6 *taken away from* 10 *leaves* 4.

---

6. Tell how many are left:

$9-6$	$7-6$	$8-5$	$9-8$
$9-3$	$7-2$	$5-4$	$6-3$
$8-3$	$6-3$	$3-1$	$5-2$
$8-6$	$8-2$	$9-2$	$6-5$

7. Take 3 from each of the numbers from 4 to 10.

8. Take 4 from each of the numbers from 5 to 10.

9. Take the lower number from the one above it:

6	5	7	9	8	6	9	6	7	8	9
3	2	1	3	2	2	2	5	2	4	4

10. 3 and how many are 5?   11. 3 and how many are 8?

12. 8 are how many more than 6?

13. 6 are how many more than 4?

14. 7 are how many more than 3?

15. 9 are how many more than 5?

Tell the missing number:

1.

*	1	2	3	*	*	4	*	2
1	*	*	*	2	1	*	3	*
2	3	3	4	4	4	5	5	5

2.

1	*	3	*	2	1	6	*	1
*	5	*	4	*	*	*	5	*
5	6	6	6	6	6	7	7	7

3.

5	*	6	*	4	*	1	5	*
*	4	*	7	*	3	*	*	6
7	7	7	8	8	8	8	8	8

4.

2	2	*	3	4	*	*	6	5
*	*	8	*	*	7	1	*	*
8	9	9	9	9	9	9	9	9

5.

9	3	*	4	5	*	2	*	1
*	*	8	*	*	6	*	7	*
10	10	10	10	10	10	10	10	10

NOTE. — Such drills as the one above should be used until pupils can give instantly the 25 combinations that make ten or less.

6. 7 is 3 more than 4; 4 is 3 less than 7.

7. 7 is 2 more than 5; 5 is 2 less than 7.

8. What can you say of

8	6	7	8	9	7	9
5	2	2	2	3	4	5

NOTE. — As the combinations are learned the numbers should be compared by showing differences as in the exercises on this page.

Tell the missing number in these exercises. The numbers above the line were added.

```
1.  *    3    *    3    *    3    3    4    5
    4    5    6    *    5    6    *    *    *
   ──   ──   ──   ──   ──   ──   ──   ──   ──
    8    *    8    7    9    *    8   10   10

2.  7    *    *    5    *    5    *    4    3
    *    6    6    *    6    5    9    *    7
   ──   ──   ──   ──   ──   ──   ──   ──   ──
    9   10    9    8   10    *   10    9    *
```

A Target Game

1. The boys in the picture on the next page are shooting at a target. They agree that each shall shoot, and then the one hitting the larger number shall score the difference. Thus if John hits 9 and Robert 5, John's score is 4.
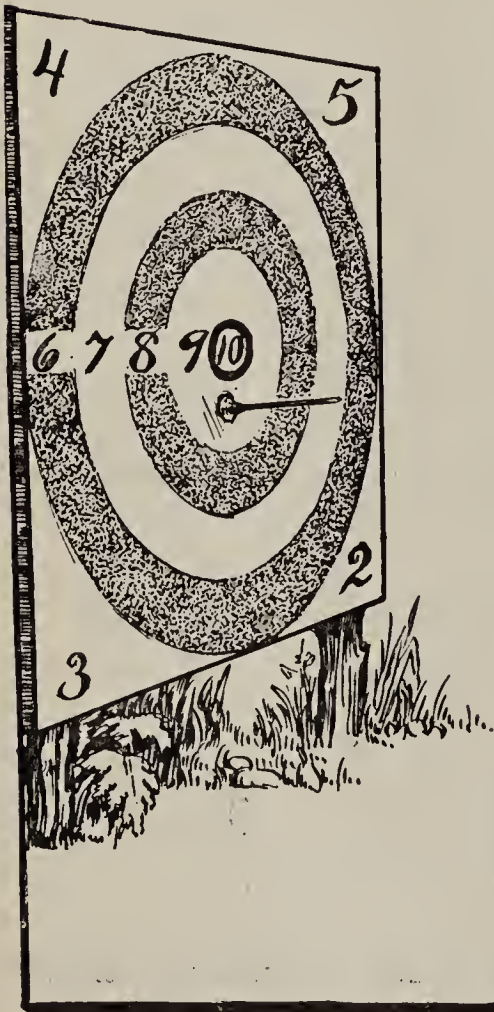
2. John has hit 9. What will be his score if Robert hits 7? If Robert hits 5? If he hits 6?

3. Robert hit 7. Tell who scores and how much when John hits 10; when he hits 9; when he hits 8.

NOTE. —(1) Make a target on the blackboard. Mark any ring as the first shot. Have pupils tell the score as a second ring is touched.

(2) Suppose John has hit 6. Let the class tell the score as you touch each number from 10 to 2.

Give differences quickly :

1.	2	5	6	4	9	8	7	10	6
	1	2	3	1	4	3	2	3	5

2.	8	3	9	7	5	10	4	10	8
	2	1	8	5	3	4	2	6	6

3.	5	9	8	6	9	3	10	7	10
	1	2	1	2	3	2	7	6	2

4.	7	6	9	4	10	9	5	10	8
	4	1	6	3	1	1	4	9	7

5.	8	9	7	8	9	6	10	10	7
	5	5	1	4	7	4	8	5	3

1. Count to twenty.

2. You know how to write numbers to ten. The numbers from ten to twenty are written:

10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

10 + 3   10 + 4
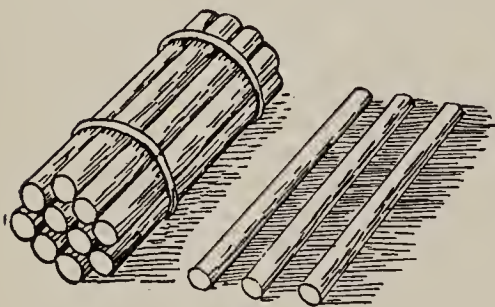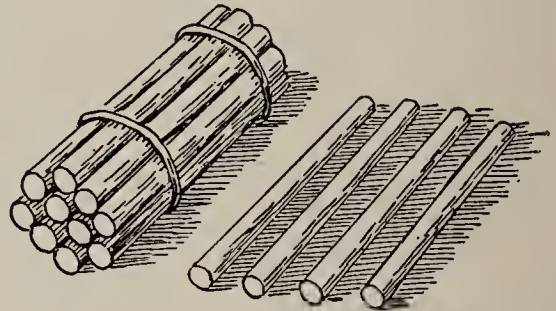
13   14

3. *Thirteen* is written 13 and means 1 *ten* and 3 *ones*.

4. *Fourteen* is written 14 and means 1 *ten* and 4 *ones*.

5. Read the numbers written below and tell what each one means.

15   16   17   18   19

6. *Twelve* is written 12 and means 1 *ten* and 2 *ones*.

7. What do you think 11 means?

8. What do we call 4 and 10?

9. What do we call 5 and 10?

10. 10 and 6 are how many?

11. 10 and 7 are how many?

12. 10 and 8 are how many?

13. 10 and 9 are how many?

NOTE. — Pupils should learn the meaning of the names of the different numbers as the "teens," twenty, thirty, etc., for it will aid very much in adding numbers whose sums are more than ten.

1. What does thirteen mean? What does fourteen mean?

2. Give another name for each of the following:

5 and 10	2 and 10	7 and 10
3 and 10	6 and 10	9 and 10
4 and 10	8 and 10	1 and 10

3. Give the sums quickly:

10	10	10	10	10	10	10
5	6	8	2	9	7	4

4. Tell how many more are needed to make 10:

9	6	8	7	4	5

5. 9 and 1 and 3 are how many?

6. 8 and 2 and 6 are how many?

7. 7 and 3 and 5 are how many?

8. Add downward:

6	7	6	8	9	8	9	7
4	3	4	2	1	2	1	3
7	5	8	4	6	7	8	8

9. 9 and 1 are how many? 9 and 1 and 5 are how many?

10. 5 and 9 is the same as 4 and 1 and 9 or ——teen.

11. Tell the missing number:

10	10	*	10	7	*	10
*	*	10	*	*	5	*
14	16	18	19	17	15	13

12. 7 and 3 and 8 are ——teen.
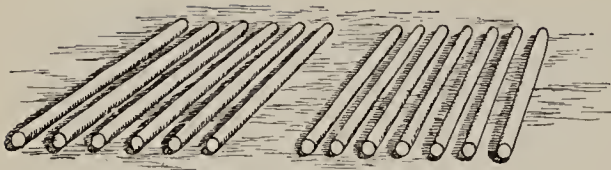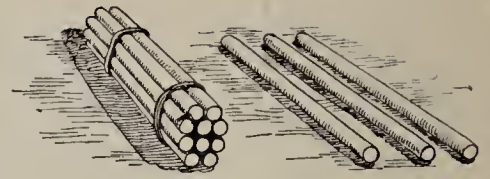
6   and   7   are   13

1. Show with objects that 6 and 7 are 13.

2. Show with objects each of the following sums:

6	6	6	6	7	7	7	7
7	5	6	4	7	5	3	4
13	11	12	10	14	12	10	11

3. Learn each sum in the table above.

4. Tell how many:

5	3	4	5	4	7	6	7
7	7	6	6	7	6	6	7

5. Tell the missing number:

7	7	7	6	6	7	7	6
*	*	*	*	*	*	*	*
12	14	11	11	12	10	13	10

6. How many are 7 marbles and 5 marbles?

7. If you have 6 cents in your bank, and your father gives you 5 cents more, how many cents will you then have?

8. John has 7 picture post cards and his sister has 6. How many have they together?

8 and 6 are 14
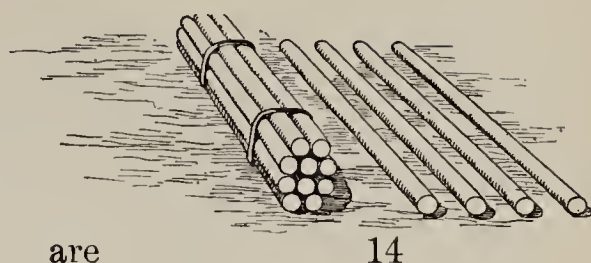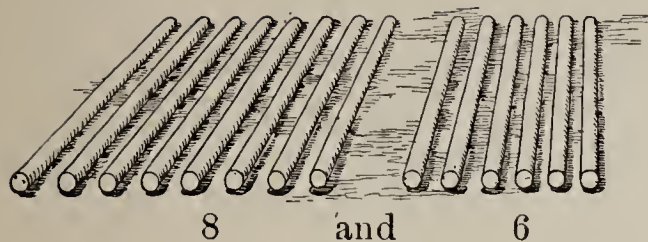
1. Show with objects, and learn, each of the sums:

8	8	8	8	8	8	8	9
6	8	5	7	4	3	2	8
14	16	13	15	12	11	10	17

2. Tell the missing number:

8	8	8	8	8	8	8	8
*	*	*	*	*	*	*	*
15	14	17	16	13	10	12	11

3. Show with objects, and learn, each of the sums:

9	9	9	9	9	9	9	9
6	4	7	5	8	9	3	2
15	13	16	14	17	18	12	11

4. Tell the missing number:

9	9	9	9	9	9	9	9
*	*	*	*	*	*	*	*
14	16	12	17	11	13	15	18

NOTE. — Have the children see that when a number is added to 8, *two less than the number added is the name of the "teen"*; and that when a number is added to 9, *one less than the number added is the name of the "teen."*

1. See if you can give the 24 sums two times in a minute :

6	8	2	9	8	7	6	4
5	8	9	5	6	5	9	8
1	6	7	8	6	8	7	6
9	7	9	3	6	2	8	4
7	5	7	4	9	7	8	9
7	8	4	9	3	3	9	9

2. Tell the missing numbers :

6	9	5	7	8	6	5	8
*	*	*	*	*	*	*	*
14	16	13	12	15	15	14	16

3. The price of admission to Fred's circus is 15 cents. If you have only 9 cents, how much more must you earn to pay for your admission?

4. If you have 13 marbles and lose 4 of them, how many will you have left?

5. Make five problems for the other children of the class, using the numbers in the table at the top of this page.

NOTE. — Make sets of cards containing the combinations in the table at the top of the page and use them in drills. Hold them before the class and give them to the children giving correct answers. See who can get the most cards, thus introducing the game element into the drills.

1. Add downward :

2	3	1	2	2	6	4	6
4	3	5	4	5	1	4	2
5	6	7	5	6	8	3	7

2. See how quickly you can give all of the following :

1	2	4	3	2	3	2	4
1	1	3	5	6	6	2	2
9	9	9	9	9	9	9	9
3	4	3	7	1	5	6	7
2	2	6	2	6	2	1	2
8	8	8	8	8	8	8	8
4	5	6	7	1	3	1	3
3	2	1	2	1	2	5	3
7	7	7	7	7	7	7	7
3	2	8	7	3	2	4	5
4	5	1	2	4	6	4	3
6	6	6	6	6	6	6	6

NOTE. — Drill frequently on such tables written on charts or blackboard.

"Going to Boston"

NOTE. — Play that a second is an hour. When a sum is called incorrectly, the train has had an accident. Encourage the pupil to be a "through flyer," not a "slow freight."

1. This is a double track railroad from Chicago to Boston. Call *C* Chicago and *B* Boston. See how long it will take you to go from Chicago to Boston.

2. How long will it take you to go from Boston to Chicago?

3. Call *D* Detroit. See how long it takes to go from Chicago to Detroit and return.

4. How long will it take to go from Detroit to Boston and return?

5. Go from Detroit to Boston and then to Chicago.

6. Go from Detroit to Chicago and then to Boston.

7. Who can go from Chicago to Boston, and back, without an accident?

8. Who can go from Boston to Chicago, and back, in one minute?
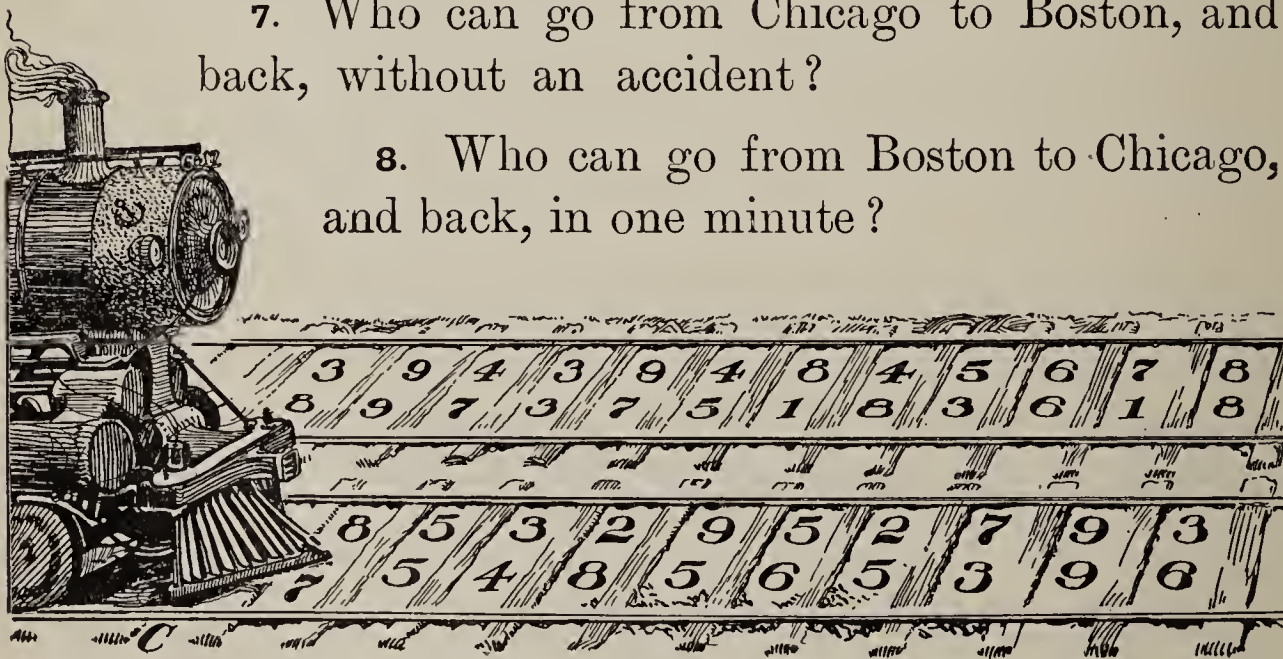
```
                SCHOOL SUPPLIES FOR SALE
Pencils  .  .  .  .  .  4 ¢    Penholders .  .  .  .  5 ¢
Erasers  .  .  .  .  .  2 ¢    Blank Books  .  .  .  6 ¢
Rulers  .  .  .  .  .  3 ¢     Tablets .  .  .  .  .  7 ¢
Ink  .  .  .  .  .  .  8 ¢     Pencil Boxes  .  .  .  9 ¢
```

What must you pay if you buy,

1. A pencil and a penholder?

2. An eraser and a tablet?

3. A ruler and a pencil box?

4. A penholder and a bottle of ink?

5. A blank book and a pencil box?

6. A bottle of ink and a blank book?

7. A tablet and a penholder?

8. A pencil box and a bottle of ink?

9. An eraser, a ruler, and a pencil?

Make other similar problems.
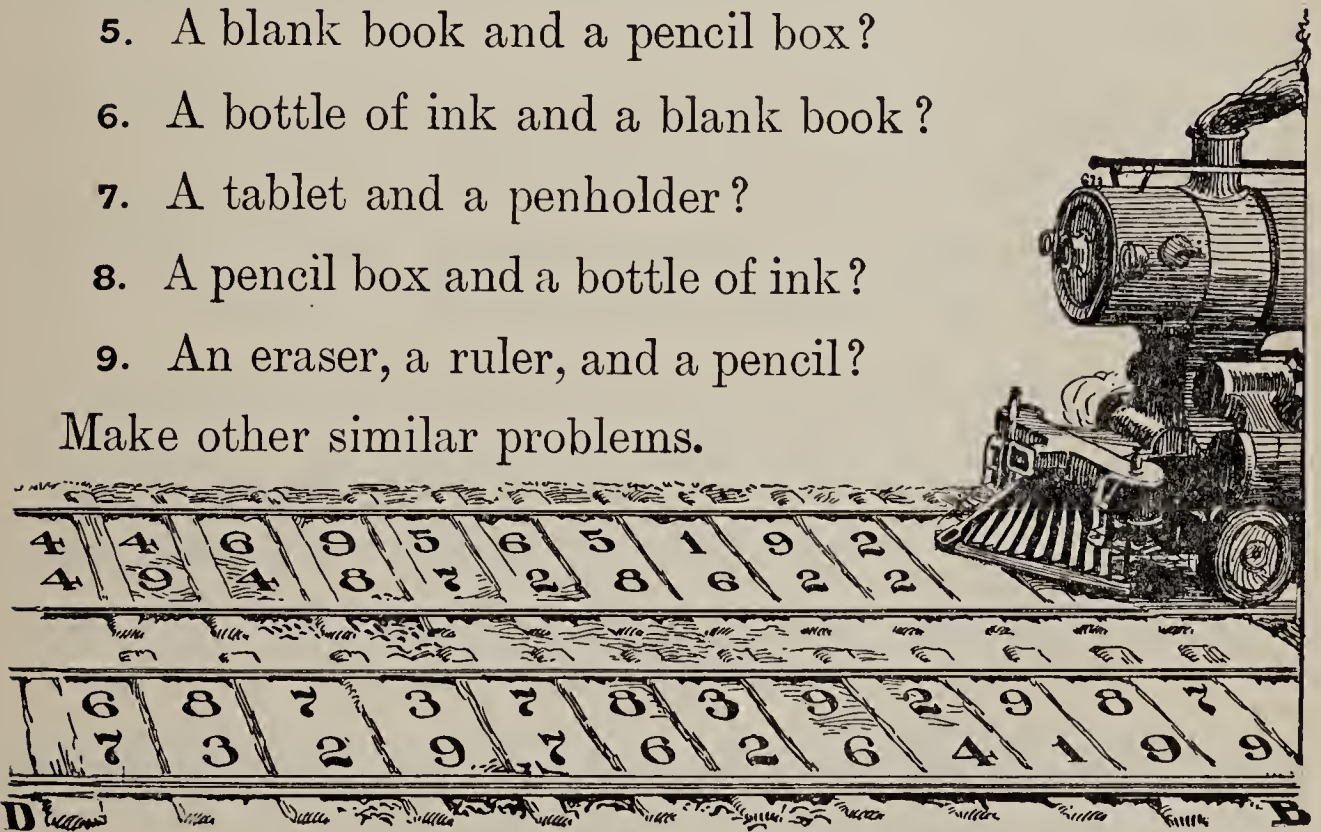
A Guessing Game

1. The teacher says, "I am thinking of two numbers whose sum is 9. Guess what they are." She was thinking of one of what four groups?

2. Had she been thinking of two numbers whose sum is 8, name the four groups from which she selected the two numbers.

3. Give two numbers whose sum is shown below the line:

| * | * | * | * | * | * | * | * | * | * | * |
*	*	*	*	*	*	*	*	*	*	*
9	9	9	9	8	8	8	8	7	7	7

4. Name five groups of two numbers whose sums are each 10.

5. Using numbers less than 10, give four groups that make 11. Four groups that make 12.

NOTE. — After playing this game with the teacher "thinking of two numbers," let pupils take turns at asking.

6. Give two numbers less than 10 that make these sums:

| * | * | * | * | * | * | * | * | * | * |
*	*	*	*	*	*	*	*	*	*
16	16	15	15	14	14	14	13	13	13

7. Give quickly all groups of two numbers whose sum is 10. All whose sum is 11. All whose sum is 12.

Practice in Addition

NOTE. — This table contains all of the primary combinations in addition, and should be reviewed very frequently.

	A	B	C	D	E	F	G	H	I	J
1.	1	2	2	3	2	3	1	2	4	5
	1	1	2	1	3	3	4	4	3	1
2.	2	4	6	3	5	6	1	7	8	2
	5	4	1	5	4	2	7	2	1	8
3.	6	5	1	3	6	9	8	7	5	4
	3	5	9	7	4	2	4	5	6	7
4.	9	3	6	6	8	9	9	7	8	2
	5	8	6	9	7	3	8	7	8	9
5.	8	9	6	9	7	5	9	4	6	7
	5	9	8	6	6	8	7	9	9	8

NOTE. — The other drills, as drills from the board and from cards and from games, give variety and should be continued. There is little danger of too much drill.

NOTE. — Below are given 60 exercises in subtraction. This table and the addition table on page 29 should be used for drill work almost daily. Work with a time limit to encourage rapidity.

When we take one number from another, we **subtract**.

Subtract :

8	6	7	8	7	5	6	7	9	8
5	2	3	6	2	2	4	4	7	3
6	7	8	9	6	9	8	9	9	9
3	5	4	2	2	4	2	3	5	6
10	11	10	12	11	10	12	10	11	12
7	3	8	5	4	6	6	5	7	9
13	11	13	12	13	14	11	12	11	12
4	5	7	8	9	9	6	7	9	4
14	15	16	11	15	13	14	12	13	11
8	9	8	8	6	6	7	3	5	2
13	15	14	16	16	14	15	18	17	17
8	7	6	9	7	5	8	9	9	8

10 + 10
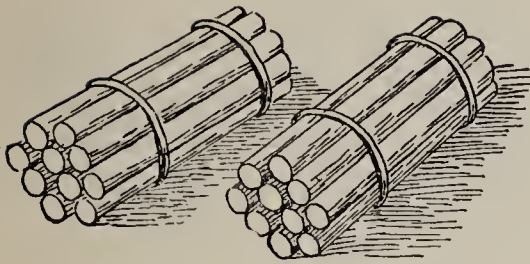
10 + 10 + 10

20
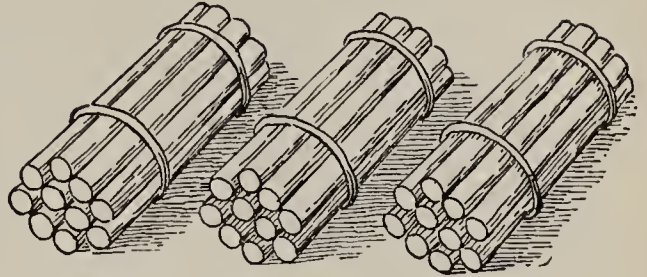
30

1. *Twenty* is written 20 and means *two tens*.

2. *Thirty* is written 30 and means *three tens*.

3. Forty is written 40 and means ———.

4. Fifty is written ——— and means ———.

5. How do you think you should write

sixty, seventy, eighty, and ninety ?

6. Count 10, 20, 30, and so on to 90.

7. *One hundred* is written 100. It means ——— tens.

8. *Thirty-five* is written 35 and means 3 *tens* and 5 *ones*.

9. Read 43, 26, 56, 73, 98, 69, 48, 64, 84, 37.

10. What are 6 tens and 2 ones called ?

11. How many are :

32	43	56	82	93	81	34	56
3	4	1	5	4	6	1	3

12. How many are :

20	30	40	50	20	20	30	60	40
10	10	10	10	20	30	30	10	20

NOTE. — Give much drill work upon such combinations as are found in exercises 11 and 12.
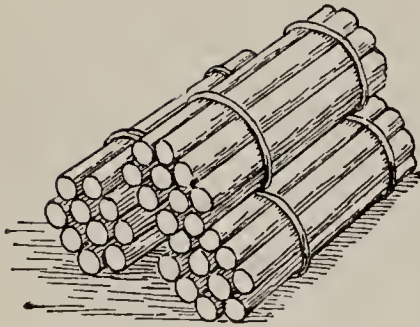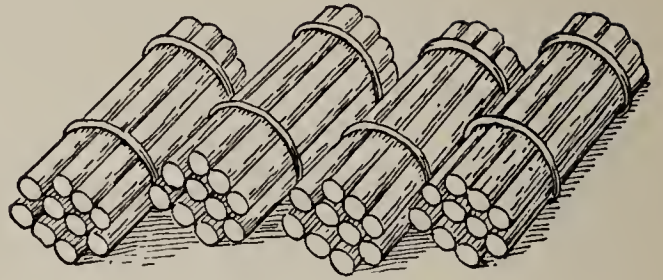
3 tens or 30   4 tens or 40

1. Add :

3 tens	30	5 tens	50	6 tens	60
4 tens	40	4 tens	40	2 tens	20

2. Subtract :

4 tens	40	7 tens	70	8 tens	80
2 tens	20	3 tens	30	5 tens	50

3. Count by 10's to 90.   Now count from 90 by 10's to 10.

4. Add :

20	70	50	20	40	60	50	80
30	20	30	60	40	30	40	10

5. Subtract :

80	70	90	70	80	90	70	80
20	50	30	40	30	50	20	40

6. A bat cost 10 cents and a ball 20 cents.   Then both cost —— cents.

7. My knife cost 50 cents and my ball 20 cents.   Both cost —— cents.   My knife cost —— cents more than my ball.

NOTE. — By adding down, only the last sum will exceed 10; hence these exercises differ but little from the primary combinations. It would be well to make other such drills on the blackboard for sight work. In adding do not allow the pupil to say "4 and 2 are 6, and 1 is 7," but "4, 6, 7." Drill for accuracy and rapidity. Use a time limit.

Add down:

1.	4	5	4	6	7	8	8	5	7
	2	1	3	2	1	1	2	3	3
	1	3	2	3	4	3	4	6	9
2.	8	6	7	6	7	4	6	8	9
	1	4	2	2	2	3	1	2	1
	6	8	3	9	6	8	8	7	6
3.	7	2	6	6	7	8	3	2	4
	3	4	3	4	1	1	4	6	3
	4	9	4	3	9	6	7	8	8
4.	3	5	7	4	5	7	4	3	5
	2	3	2	3	3	1	3	2	2
	4	2	1	2	1	2	2	1	1
	6	8	6	7	6	9	7	6	7

Halves　　　　　　　　Fourths

1. If you have an apple, to how many children can you give half of an apple each?

2. If you have one apple, to how many children can you give a fourth of an apple each?

3. If you divide an orange into two equal parts, what part of an orange is each piece?

4. A half of an orange will make how many fourths of an orange?

5. A cake is divided equally among four children. What part of the cake will each have?

6. Mary had 6 cherries and gave Alice half of them. How many did she give Alice? How many did she keep?

7. Harry had 8 pears and gave away half of them. How many did he give away? How many had he left?

Note. — Children hear the terms halves and fourths used and should know their meaning about as early as they know the meaning of integral numbers. To these $\frac{1}{3}$ may be added. There are three phases of the use of a fraction, viz: (1) a part of one object; (2) a part of a group of objects; and (3) the relation of one object to another. The first phase is perhaps the most natural. The pupil should think of a fractional unit as a thing.
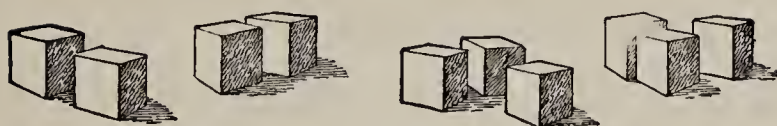
1. 2 and 2 are how many ? 2. 3 and 3 are how many ?

3. 4 and 4 are how many ? 4. 5 and 5 are how many ?

5. How many :   2   3   4   5
                 2   3   4   5

6. How many times did we take each number ?

7. 2×2 means that we add two 2's.

8. 2×3 means that we add two 3's.

$2 \times 4 = 8$ *is read* 2 *fours are* 8, *or* 2 *times* 4 *are* 8.

---

9. $2 \times 2 = ?$ $2 \times 4 = ?$
   $2 \times 3 = ?$ $2 \times 5 = ?$

10. When we divide a group into two equal parts, what is each part called ?

11. One half of 6 pears is how many pears ?

12. One half of 4 cents is how many cents ?

13. One half of 8 nuts is how many nuts ?

14. One half of 10 cents is how many cents ?

NOTE. — The pupil should develop the multiplication tables through addition and thus see that remembering these tables saves time when the addends are all equal. The twos are already known from the primary combinations in addition. The only thing new here is the notation.

1. How many halves in an apple?

2. How many halves in an inch?

3. If you have 4 pieces of candy and give away half of them, how many pieces do you keep?

4. If Lucy has 6 dolls and lets you play with half of them, how many do you have to play with?

5. One half of 8 inches is how many inches?

6. One half of 10 cents is how many cents?

We write " one half of 10 is 5 " in another way; thus, $\frac{1}{2}$ *of 10 = 5.*

---

7. Write in a shorter way:

One half of 4 is 2.
One half of 6 is 3.
One half of 8 is 4.
One half of 10 is 5.

8. If we divide 8 things into two equal groups, how many will there be in each group?

$8 \div 2 = 4$, *is read " 8 divided by 2 equals 4." It is another way to write* $\frac{1}{2}$ *of 8 = 4.*

NOTE. — Work in fractions may be objectified by giving pupils exercises on the foot rule.

1. $6 + 6 = ?$

2. Show your teacher another way to write $6 + 6 = 12$.

3. $7 + 7 = ?$	$2 \times 7 = ?$
4. $8 + 8 = ?$	$2 \times 8 = ?$
5. $9 + 9 = ?$	$2 \times 9 = ?$
6. $\frac{1}{2}$ of $12 = ?$	$12 \div 2 = ?$
7. $\frac{1}{2}$ of $14 = ?$	$14 \div 2 = ?$
8. $\frac{1}{2}$ of $16 = ?$	$16 \div 2 = ?$
9. $\frac{1}{2}$ of $18 = ?$	$18 \div 2 = ?$

10. $3 + 3 = 2 + 2 + 2$ $4 + 4 = 2 + 2 + 2 + 2$
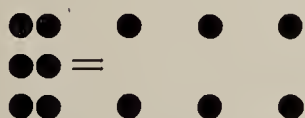
$2 \times 3 = 3 \times 2$ $2 \times 4 = 4 \times 2$

11. With splints or cubes show that 2 fives are the same as 5 twos.

$$2 \times 5 = 5 \times 2$$

12. 2 threes are equal to —— twos.

13. 2 fours are equal to —— twos.

14. 2 fives are equal to —— twos.

15. $2 \times 6 = 6 \times$ ——.   **16.** $2 \times 7 = 7 \times$ ——.

$2 \times 8 = 8 \times$ ——. $2 \times 9 = 9 \times$ ——.

17. If a book costs 16 cents and a tablet half as much, how much does the tablet cost?

NOTE. — Let the pupil see clearly such relations as $2 \times 5 = 5 \times 2$. Also let him see that the first figure is the multiplier; that is, it is a pure abstract number merely denoting the number of addends to be combined.

1. This picture is exactly three inches long. How long do you think the lines of this page are?

2. Do you have a foot rule? Count the numbered spaces.

3. What is each numbered space on the foot rule called?

4. How many inches in 1 foot?

> 12 inches make 1 foot
> 12 in. = 1 ft.

5. Measure a yardstick with your foot rule. How many feet in 1 yard?

> 3 feet make 1 yard
> 3 ft. = 1 yd.

6. How much more than a yard is 4 feet?

7. How many feet in 2 yards?

8. How much less than 2 yards is 5 feet?

9. If 12 inches should be cut off from a yardstick, how many feet would be left?

10. How tall is Tom if he is a yardstick and a foot rule in height?

1. Four inches and 3 inches are how many inches?

2. How many are 5 inches and 4 inches?

3. Five inches and 7 inches are —— inches, or just one ——.

4. 2 feet and 1 foot are how many feet? What else is this called?

5.	6.	7.	8.
2 inches	4 feet	3 yards	4 feet
3 inches	5 feet	2 yards	6 feet
4 inches	2 feet	6 yards	5 feet

9. How much less than a foot is 10 inches?

10. How much more than a foot is 14 inches?

11. 8 inches and how much more make a foot?

12. What else may you call 6 inches and 6 inches?

13. Give another name to the following:

8 inches and 4 inches	1 inch and 11 inches
5 inches and 7 inches	3 inches and 9 inches
10 inches and 2 inches	6 inches and 6 inches

14. Give in inches:

1 foot less 8 inches	1 foot less 10 inches
1 foot less 5 inches	1 foot less 7 inches
1 foot less 6 inches	1 foot less 4 inches

15. Draw lines on the blackboard showing the size of the page of a book 5 inches wide and 8 inches long.

NOTE. — Either real or toy money should be actually handled by the pupils.

1. James has 3 cents and John has 8 cents. How many cents have both?

2. If you spend 6 cents for a pencil and 10 cents for a book, how much do you spend in all?

3. If you buy a 3-cent pencil and give the clerk a dime, how much change will he give you?

Five cents make one nickel
Ten cents make one dime

---

4. How much are

| 6 cents and 7 cents? | 9 cents and 8 cents? |
| 8 cents and 4 cents? | 8 cents and 6 cents? |

5. If I buy a 2-cent pencil and a 5-cent tablet, how much will both cost?

6. How much change shall I get back if I buy 8 cents worth of candy and give the clerk a dime?

7. How many nickels are 3 dimes worth?

8. I have 20 cents and spend a dime. How much have I left? How many nickels is it worth?

9. Mary had two dimes and spent a nickel. How much had she left?

10. After school Harry earned a dime and a nickel. How many cents was that?

11. Lucy bought a pencil and tablet for 7 cents. How much change will she receive from a dime?

"Playing Store"

1. These children are in a store. They have "make-believe" money. The teacher is storekeeper. Ruth has just bought an eraser for 3 cents. She gave the store-keeper a nickel. What change should she receive?

2. Henry bought a book for 7 cents. He gave the storekeeper a dime. What change should he receive?

3. Mary bought a box of colored crayon for 8 cents. She gave the storekeeper a dime. What change should she receive?

4. Robert bought a paper-weight for 8 cents and gave the storekeeper the exact change. What pieces of money did he give her?

NOTE. — This game has proved to be a very valuable and very interesting exercise. After pupils have learned to buy and make change with teacher as storekeeper, let one or more pupils be the storekeeper and the rest buy of them. If real or toy money is not at hand, let the pupils make from cardboard *cents*, *nickels*, and *dimes*.

The smallest coin that we use is the **cent**.

A **nickel** = 5 cents.	A **quarter** of a dollar = 25 cents.
A **dime** = 10 cents.	A **half dollar** = 50 cents.
A **dollar** = 100 cents.	$ means *dollars* ; ¢ means *cents*.

When we write dollars and cents together, we put a *period* called a **decimal point** between them. Thus :

$3.25 is read 3 dollars and 25 cents.

1. Read : $1.25; $1.50; $2.75; $3.24; $4.50; $6.95; $0.75; $0.68.

2. We may write 5 cents another way, it is $0.05. Ten cents may be written 10 ¢ or $0.10. (The zero shows that there are no dollars.) Write 7 cents in two ways; write 15 cents in two ways.

3. $1.05 is read 1 dollar and 5 cents. Read $3.08; $5.80; $0.75; $0.60; $0.06; $3.60; $3.06.

4. 2 nickels equal how many cents ?

5. 15 cents equal how many nickels ?

6. Two dimes equal how many cents? If Alice gave the clerk 2 dimes to pay for a writing tablet costing 12 cents, how much change did he give her ?

7. When I give the clerk a quarter to pay for 17 cents worth of meat, how much change shall I get back ?

8. If from a quarter the clerk takes out 15 cents to pay for a writing book and a pencil, how much change shall I get ?

1. Fill a pint measure with water. Empty it into a quart measure. Do this until you fill the quart measure.

2. How many pints does it take to make a quart?

3. A quart of sand will fill how many pint measures?

4. A pint is what part of a quart?

> **2 pints (pt.) = 1 quart (qt.)**
> **1 pint (pt.) = one half of a quart**

5. How many pints in two quarts?

6. 6 pints are how many quarts?

7. If a quart of milk costs 6 cents, how much will a pint cost?

8. If a pint of nuts costs 5 cents, how much will a quart cost?

9. Mary and Ruth each gathered a quart of berries. How many pints did each gather? How many pints did both gather?

10. At 3 cents a pint, how much will a quart cost?

11. At 5 cents a pint, how much will a quart and a pint of nuts cost?

NOTE. — While there is a little difference between the quart used in measuring liquids and the one used in measuring nuts or berries, it need not be brought out now.

1. Lucile bought 2 yards of ribbon for her doll. She paid 6 cents a yard. How much did she pay? How much more than a dime did she pay?

2. How many inches in 1 foot and 6 inches?

3. 6 inches is what part of a foot?

4. At 5 cents a pint, what will a quart of milk cost?

5. At 8 cents a quart, what will a pint of milk cost?

6. Charles has 2 dimes. How many cents are they worth? How many more cents will make a quarter?

7. 30 cents is how much more than a quarter?

8. James bought some marbles for 12 cents and a 5-cent top. How much change should he receive if he gave the clerk 20 cents?

9. At 18 cents a yard, how much will $\frac{1}{2}$ yard of ribbon cost?

10. At 16 cents a quart, how much will a pint of nuts cost?

11. If Henry feeds his chickens a pint of corn every day, how long will 5 quarts last?

12. How many inches in a foot? If you step 20 inches, how much more than a foot do you step?

13. How many pint bags may be filled from 2 quarts of peanuts?

14. If cream is 32 cents a quart, how much is that for a pint?

15. 12 pints are how many quarts?

We have another way of writing numbers. You have seen numbers written this way on a clock face. The numbers on a clock face are:

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	2	3	4	5	6	7	8	9	10	11	12

When the long hand on the clock dial points to XII, the clock strikes the hour pointed to by the short hand.

1. What time is it when the long hand is at XII and the short one points to III? Tell what hour it is when the long hand is at XII and the other at VI.

2. Leave the long hand at XII and move the short hand to each of the other numbers, telling the time at each one.

3. In an hour the long hand moves once around the circle, but the short hand moves only from one number to the next one. How long will it take the long hand to move from XII to VI?

4. When the long hand is at VI, it is half past some hour. What time is it when the long hand is at VI and the short hand between IV and V?

5. Leave the long hand at VI and tell what time it is when the short hand is between II and III; between III and IV; between V and VI; between VI and VII.

NOTE. — This page is to teach the Roman numerals to XII and how to read time to hours and to half hours. Use a clock dial.
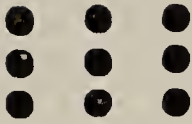
1. $3 + 3 + 3 = ?$ $3 + 3 + 3 + 3 = ?$

2. How many threes in the first group of dots?

3. How many threes in the second group of dots?

4. How many fours in the second group?

5. $3 \times 3 = ?$ $3 \times 4 = ?$ $4 \times 3 = ?$ $3 \times 5 = ?$ $5 \times 3 = ?$

If you divide anything into three equal parts, each part is **one third** *of the thing.*

6. How many acorns in the whole group?

7. How many acorns in *one third* of the group?

8. One third of 9 acorns is ——— acorns.

$\frac{1}{3}$ *of* $9 = 3$.   *This is read "one third of 9 is 3."*

9. $\frac{1}{3}$ of $6 =$ ———. $\frac{1}{3}$ of $12 =$ ———. $\frac{1}{3}$ of $15 =$ ———.

10. When 3 pears cost 9 cents, how much will one cost?

11. When 3 pints of milk cost 12 cents, how much will 1 pint cost?
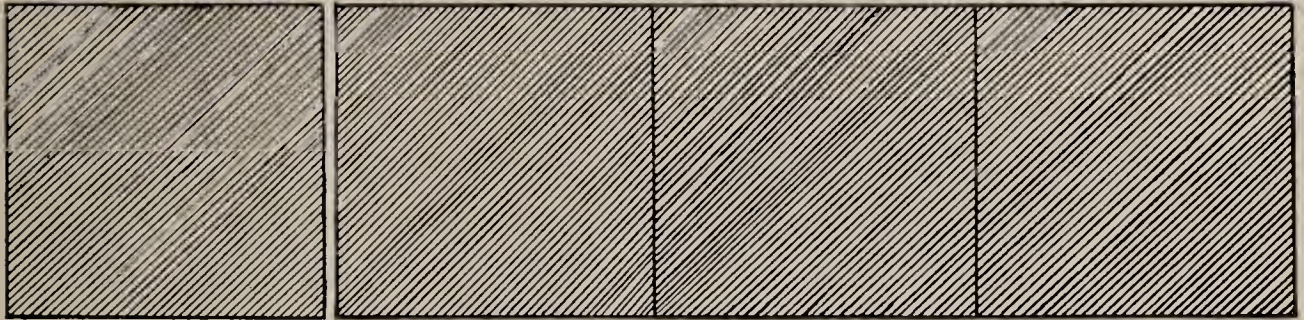
A square inch   A rectangle one inch wide and three inches long

1. How many square inches can you make from this rectangle?

2. How many rectangles like this one could you make from a rectangle 2 inches wide and 3 inches long?

3. How many square inches in a rectangle 2 inches wide and 3 inches long?

4. Draw a square with each side 3 inches.

5. Divide the square you have made into rectangles 1 inch wide and 3 inches long. How many does it make?

6. How many square inches will each rectangle make?

7. How many square inches will the whole square make?

8. A triangle has three sides. If each side of a triangle is 2 inches long, how far is it around it?

9. If each side of a triangle is 5 feet long, how far is it around it?
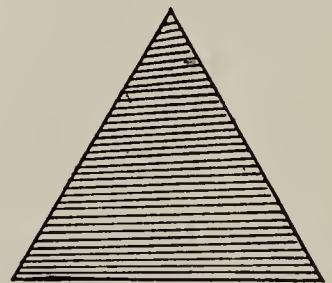
A triangle

NOTE. — The measurement of rectangles gives concrete work in multiplication. Each rectangle should be accurately constructed and divided into rectangles 1 inch wide, and at least one of the rectangles should be divided into square inches.

1.
$$
\begin{array}{cccc}
6 & 7 & 8 & 9 \\
6 & 7 & 8 & 9 \\
\underline{6} & \underline{7} & \underline{8} & \underline{9}
\end{array}
$$

2. $3 \times 6 = ?$ $3 \times 7 = ?$ $3 \times 8 = ?$ $3 \times 9 = ?$

3. $6 \times 3 = ?$ $7 \times 3 = ?$ $8 \times 3 = ?$ $9 \times 3 = ?$

4. Mary colored 6 Easter eggs for each of 3 little girls. How many did she color for all three girls?

5. There are 7 days in one week. How many days in 3 weeks?

6. If a newspaper costs 8 cents a week, how much will it cost for 3 weeks?

7. If a boy earns 9 cents each morning delivering papers, how much will he earn in 3 mornings?

8. Alice feeds her pony 3 quarts of oats a day. How many quarts does she feed it in a week?

9. Harry has 12 apples. How many can he give to each of 3 boys?

10. Lucy gathered 3 quarts of nuts. The whole party gathered 8 times as many. How many did all gather?

11. There are 3 feet in a yard. How many feet are there in 8 yards?

12. Tell how many:

$\frac{1}{3}$ of 18 $18 \div 3$ $\frac{1}{3}$ of 24 $24 \div 3$

$\frac{1}{3}$ of 21 $21 \div 3$ $\frac{1}{3}$ of 27 $27 \div 3$

PRIMARY ARITHMETIC

PART TWO: THIRD YEAR

READING AND WRITING NUMBERS
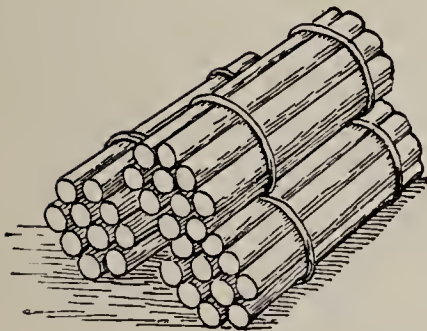
3 tens or 30
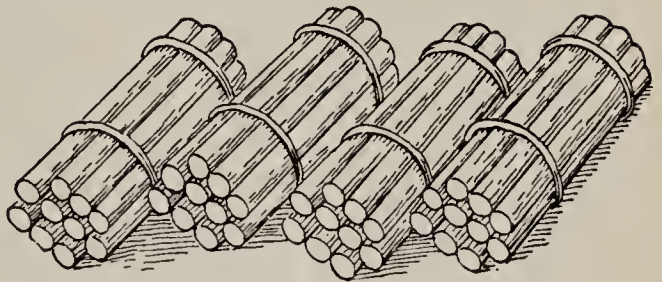
4 tens or 40

1. How many *tens* in *thirty?*
2. How many *tens* in *forty?*
3. *Two tens* are called what?
4. *Five tens* are called what?
5. *Eight tens* are called what?
6. Count by tens from 10 to 90.

7. Write in figures:

twenty	*forty*	*sixty*	*eighty*
thirty	*fifty*	*seventy*	*ninety*

Ten tens are written 100 and are called **one hundred.**

1. 245 is read "two hundred, forty-five."

When we use three figures to express a number, the one at the left shows how many **hundred** *there are.*

---

2. 563 is read 5 hundred, 63.

3. 308 is read 3 hundred, 8.   4. 600 is read 6 hundred.

5. Read :

| 324 | 843 | 784 | 709 | 900 |
| 693 | 235 | 379 | 407 | 800 |

Zero *is written* 0 *and means* **not any**.

In 600 the 6 means 6 *hundred* and the 0's show that there are no *tens* and no *ones*.

725 means 7 hundred, 2 tens, and 5 ones.   805 means 8 hundred, no tens, and 5 ones.

6. What does each figure of 720 mean ?

7. Write in figures :

two hundred, forty-seven   nine hundred, six
six hundred, fifty-three   seven hundred, four
seven hundred, sixty   six hundred, seven

Do not use **and** *in reading whole numbers.*

---

100 or 10 tens   10 or 10 ones   1

1. How many *ones* in 2 *tens?* In 3 *tens?*

2. How many are 3 *tens* and 5 *ones?*

3. How many are 4 *tens* and 7 *ones?* 5 *tens* and 6 *ones?*

4. How many *tens* and how many *ones* in:

33	75	86	67	42
44	84	43	53	53
55	63	28	81	35
66	97	42	96	27

5. How many *tens* in 2 *hundred?* In 4 *hundred?*

6. How many *hundreds, tens,* and *ones* in:

333	347	784	396	999
444	68	968	587	888
726	196	634	602	700

7. Write in figures:

3 *hundred,* 4 *tens,* and 6 *ones.*   6 *hundred* and 7 *ones.*
8 *hundred,* 6 *tens,* and 7 *ones.*   7 *hundred* and 3 *tens.*
9 *hundred,* 8 *tens,* and 2 *ones.*   8 *hundred* and 6 *ones.*
6 *hundred,* 7 *tens,* and 5 *ones.*   2 *hundred* and 0 *ones.*
5 *hundred,* 0 *tens,* and 0 *ones.*   6 *hundred* and 3 *ones.*

Drill Table

1	6	1	2	7	3	4	3	2
1	2	9	3	1	3	2	1	8
6	2	1	7	3	1	3	3	8
1	2	5	2	6	2	4	5	1
3	5	4	4	5	3	5	4	4
7	5	1	4	2	4	4	6	4
9	5	7	5	8	7	3	9	7
2	7	9	8	9	7	8	5	8
8	9	7	9	8	4	7	8	5
4	9	4	3	8	9	6	6	6

Give quickly : (Add downward)

4	2	3	1	3	4	1	6	5	1
5	3	4	4	5	3	2	3	2	5
2	7	9	8	9	7	8	5	8	6

6	3	2	2	3	2	6	4	1	2
2	6	5	7	5	2	1	4	4	4
4	9	4	3	8	9	6	6	6	9

NOTE. — Work like the following must be thoroughly mastered before column addition can be well done.

1. How many are 20 and 3? 30 and 6? 70 and 8?

2. Add:

60	70	40	70	90	80	50
8	9	3	6	7	4	5

3. How many are 18 and 1? 22 and 3? 42 and 4?

4. Add:

21	43	61	83	96	46	54
7	2	4	2	2	3	2

65	73	46	86	91	75	86
2	4	3	2	4	3	2

5. Beginning with 17, count 5 more. Then 17 and 5 are 22. So 27 and 5 are 32. 37 and 5 are 42.

6. How many are 47 and 5? 57 and 5? 67 and 5? 77 and 5?

7. Beginning with 18, count 6 more. Then how many are 18 and 6? How many are 28 and 6? 38 and 6?

8. Add:

48	58	68	78	88	98
6	6	6	6	6	6

9. Add:

15	25	35	45	55	65	75	85
7	7	7	7	7	7	7	7

1. John's score is 17.   What will it be if he hits 5?
6? 8? 9? 4? 7? 2? 3?

2. If Mary has already a score of 27, what will she
have when she makes any one of the following:

4	5	6	7	8	9

NOTE. — Make such a target upon the blackboard.   Starting with any score
above 10, have pupils tell the score when any number is touched.   Encourage
rapid work.

3. *Add:*

3	6	4	9	8	9	8	5	6	7
9	8	7	6	7	6	8	5	6	7
4	3	8	4	6	5	7	5	6	7

4. In what other way did you know the sums of the
last three columns, without adding?

1. Cut out an opening in a card so that all but four numbers in a column of this table may be covered. Place the card over each column of the table, and give the sum of the four numbers that are shown through the opening.

5	8	4	9	4	6	8	2	7	8	9
2	2	5	5	4	6	8	7	9	3	3
4	2	7	8	3	9	7	5	6	2	6
3	9	4	5	6	9	5	6	8	6	7
3	3	6	5	7	6	5	4	7	9	4
3	7	9	5	8	4	3	9	7	8	8

2. Charles made a square and divided it as shown here. He cut the numbers from 1 to 9 from a calendar. The game is to place all 9 figures upon the squares so that the sum of three numbers in any row is 15. Would you like to make such a game and play it at home?
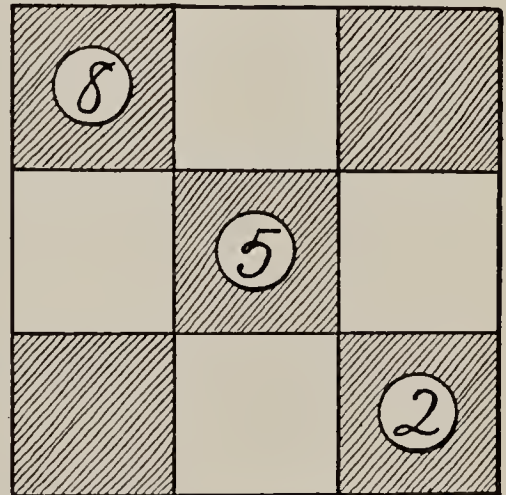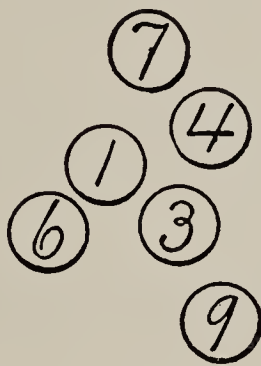
NOTE. — Such a game will furnish an interesting home game. In trying to arrange the numbers upon the board, there is much practice in adding 2 and 3 numbers.

Bill of Fare in the Lunch Room of the Washington School

Milk	3¢	Chicken Sandwich . .	8¢
Cocoa	4¢	Beef Sandwich . . .	7¢
Soup	6¢	Lettuce Sandwich . .	4¢
Baked Beans . . .	5¢	Bread and Butter . .	5¢
Creamed Potatoes .	6¢	Sliced Tomatoes . . .	6¢

1. What will your lunch cost if you take milk and bread and butter?

2. If you take a chicken sandwich, sliced tomatoes, and cocoa?

3. If you take a beef sandwich, soup, and milk?

4. If you take cocoa, creamed potatoes, and a lettuce sandwich?

5. If you take baked beans, bread and butter, and milk?

6. Select any two things that will not cost more than 10 cents, and then any third one you would like, and give the cost.

7. Select any three things you would like for lunch, and tell the cost.

8. Select 3 things for a lunch that will cost $ 0.13.

9. What is the smallest sum for which you could get any 4 of these articles for lunch?

NOTE TO THE TEACHER. — Give similar exercises from other bills. Encourage rapid, accurate work.

NOTE. — Daily drill from this or similar tables should be continued until the sums of any number of one order and one of two orders can be given automatically. This is imperative for successful column addition. Fix time limits occasionally.

A	41	37	45	92	69	84	11	38	75	52
	1	7	7	4	9	5	6	9	9	7
B	94	67	31	83	42	95	63	81	44	39
	4	2	2	4	3	6	5	7	8	2
C	75	92	37	86	61	36	84	92	46	73
	8	2	8	6	3	8	6	8	9	7
D	63	56	13	81	35	42	98	63	81	49
	3	7	9	4	5	6	8	8	8	3
E	37	41	28	14	63	57	32	81	48	14
	3	5	5	7	6	9	9	9	3	9
F	12	35	15	65	38	55	34	53	74	63
	5	8	9	8	1	5	9	3	7	7
G	64	26	26	15	45	33	49	62	92	49
	7	4	6	7	6	4	8	9	6	6

1. Frank had 28 quarts of nuts, and gathered 7 quarts more. How many quarts did he then have?

2. Frances had 37 cents in her bank, and put in 9 cents more. How many cents did she then have in her bank?

3. George had 25 cents. He earned 8 cents more. How much did he then have?

4. Sydney's knife cost 45 cents and his marbles cost 8 cents. How much did both cost?

5. Grace gathered 48 sweet peas and 7 roses. How many flowers did she gather in all?

6. Donald caught 8 trout, and his father caught 17. How many trout did both catch?

7. Mary's mother bought 9 quarts more milk this month than last month. She bought 37 quarts last month. How many quarts did she buy this month?

8. George weighs 67 pounds. Harry weighs 6 pounds more. How much does Harry weigh?

9. Howard's pony cost $75 and his saddle cost $9. How much did both cost?

10. Gladys wrote 14 words and misspelled 5. How many did she have right?

11. Henry will be 16 years old in 7 years. How old is he now?

12. Peter's scores in shooting were 6, 7, 2. Frank's were 8, 3, 5. Find the total score of each. Who won?

1. Lucile has 46 picture postal cards from the United States and 9 from England. How many postal cards has she?

2. Charles has read 87 pages of his new book and has 8 pages more to read. How many pages in the book?

3. Margaret spent 85 cents for a doll and 9 cents for some ribbon. How much did she spend for both?

4. Mary's mother spent $56 for a dress and $8 for a hat. How much did both cost?

5. John's father spent $36 for a suit and $6 for a pair of shoes. How much did both cost?

6. Frank caught 19 perch and his father caught but 8. How many did both catch?

7. Mary has 16 pansies in one bed and 9 in another. How many has she in both?

8. Henry is 58 inches tall, and his father is 9 inches taller than he. How tall is Henry's father?

9. Eliza paid 5¢ for walnuts, 7¢ for pecans, and 8¢ for almonds. How much did she pay for all the nuts?

10. Henry had 56 cents in his bank and his father gave him 8 cents more. If he puts this in the bank, how much will there be in it?

11. Fred sold 9 papers in the forenoon and 26 in the afternoon. How many did he sell in all?

12. Grace has 26¢ and she asks her father for 9¢ more, so that she can buy a doll. How much does she expect to spend for it?

1. *Add:*

A	B	C	D	E	F	G	H	I	J	K
3	6	7	8	6	7	8	6	7	4	8
7	9	4	9	4	5	4	5	8	3	7
8	3	6	7	9	6	7	9	6	9	4

2. *Add:*

A	B	C	D	E	F	G	H	I	J	K
2	1	8	7	8	3	7	3	3	5	2
4	9	7	3	4	6	2	3	9	7	1
6	7	5	9	8	3	8	9	6	8	9
8	3	2	6	6	8	3	3	4	6	6

3. *Copy and add:*

4	5	7	8	6	7	7	6	5	3	4
3	3	2	1	2	2	3	7	4	8	3
6	7	3	3	3	4	2	8	6	2	2
4	6	6	4	5	6	4	2	7	6	4

6	5	6	7	8	8	9	2	7	8	6
4	4	4	3	3	4	6	7	9	3	7
3	3	3	4	9	2	2	6	6	9	8
6	5	2	5	5	6	3	5	1	2	3

NOTE. — From the blackboard give much sight work in adding such columns

Find the total score for each game and tell who won.

1.

Mary	3	0	9	7	0	0
James	7	4	0	3	0	3

2.

0	4	5	3	0	4
0	0	3	3	4	3

3.

Mary	0	3	5	4	3	4
James	9	0	3	5	4	9

4.

0	7	3	0	0	3
3	0	0	3	3	4

5.

Mary	0	5	5	9	0	7
James	5	7	7	9	3	0

6.

3	0	5	7	9	5
3	5	5	4	3	4

7.

Mary	4	4	7	3	9	0
James	0	9	5	4	5	7

8.

7	0	3	4	9	4
5	4	3	0	7	3

9.

Mary	5	3	9	0	7	9
James	0	9	7	3	5	3

10.

3	3	7	0	3	9
3	0	9	3	0	7

1. Make 120 small squares of cardboard. Number four of them **1**, four **2**, four **3**, etc., to **30**.

2. Place them face downward in the center of the table, as in dominoes, and mix thoroughly.

3. Each player in turn draws a square and places it face upward before him on the table. It is left there unless it can be used as shown in the next step.

4. As a square is drawn, the player looks at the numbers in front of the other players. If he sees two or more numbers the sum of which is equal to the number on the square he has drawn, he takes them.

5. These squares, together with his own square, make a book which is placed at one side.

6. The player who first gets five books wins the game.

1. If you see 3, 8, and 9, what must you draw to take them?

2. What must you draw to take 2, 9, and 7?

3. What must you draw to take 8, 6, 4, and 7?

4. What must you draw to take 5, 6, 3, and 8?

5. What must you draw to take 7, 4, 9, and 6?

6. What must you draw to take 9, 5, 3, and 8?

7. What must you draw to take 14, 7, and 5?

8. What must you draw to take 18, 4, and 4?

9. If you see 11, 6, and 7, and draw 23, can you take them?

10. If you see 16, 6, and 5, and draw 27, can you take them?

11. Help the teacher make a set of squares, and play the game at recess. Would you like to play the game at home?

NOTE.—Supplement the description above by oral explanation. Make a set of squares, and teach the children to play the game. Make up additional drills like those above, as preparation for the game. Encourage the children to play the game at home.
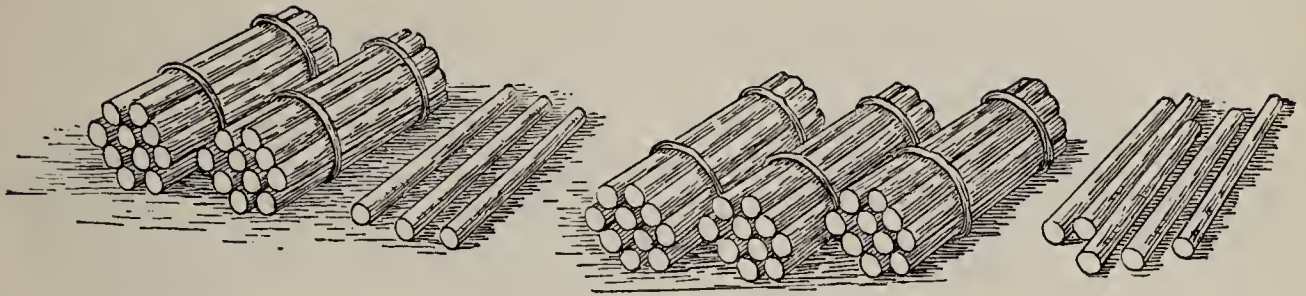
2 *tens* and 3 *ones*   23   3 *tens* and 5 *ones*

35

58

NOTE. — As this work is done on the board by the teacher, have the pupils count the splints, adding the *ones* and the *tens*. No "carrying" is yet introduced.

Add :

1. 43	2. 16	3. 19	4. 17	5. 24
+ 24	+ 42	+ 60	+ 42	+ 71

6. 22	7. 43	8. 81	9. 63	10. 12
+ 74	+ 26	+ 17	+ 25	+ 76

11. There are 38 people in one street car and 41 in another. How many in both cars?

12. My book cost 32 cents and my slate cost 16 cents. Both cost how many cents?

13. If I pay 20 cents for a ball and 25 cents for a catching glove, how much do I pay for both?

14. Charles has 23 marbles and James has 14. How many have both?

15. Mary spent 25 cents for a doll and 12 cents for some ribbon. How much did she spend in all?

2 tens and 5 ones　　　+　　　4 tens and 8 ones
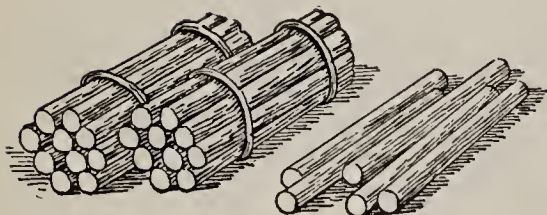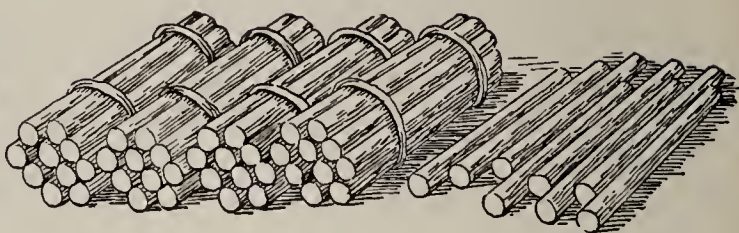
25　　　+　　　48

1. How many ones in all?　How many tens in all?

2. 13 ones are how many more than ten?

3. Then there are 3 ones and how many tens in all?

25
48
——
73

EXPLANATION OF WORK. — 8 ones and 5 ones are 13 ones, or 1 ten and 3 ones. And 4 tens and 2 tens are 6 tens, which with the 1 ten from 13 ones make 7 tens. So in all there are 7 tens and 3 ones, or 73.

4. Add 36 and 29; add 48 and 39; add 56 and 37.

Explain how each answer is obtained.

WORK	WORK	WORK
36	48	56
29	39	37
65	87	93

NOTE. — Use splints to show the adding in Exercise 4.

5. Add :

48	29	38	57	39
36	37	48	38	28

73	78	67	48	56
19	19	94	79	79

1. Add: 46
           87
          ———
          133

2. What is the sum of 6 and 7 ?

3. 13 is —— ten and —— ones.

4. What other tens are to be added ?

5. In all how many tens ?

NOTE. — Lead the pupil to see that by writing the 3 only of the 13 and adding the 1 to 8 before adding the 4 we have $1 + 8 + 4$ as the number of tens. It may be well to use splints in presenting the matter, and in this way show the carrying process.

6. Tell how we added these :

28	47	36	49	55
39	28	18	13	38
67	75	54	62	93

7. Add:

43	64	53	24	38
29	28	28	19	17

67	77	83	86	76
58	46	49	98	98

284	362	186	238	329
392	485	493	146	165

187	165	423	368	285
349	387	198	197	169

Add:

1. 36	2. 72	3. 86	4. 96	5. 76	6. 94
48	49	97	88	89	76

7. 42	8. 73	9. 82	10. 94	11. 86	12. 76
79	86	37	43	63	94
43	44	65	68	96	74

13. 34	14. 84	15. 28	16. 72	17. 73
28	62	16	26	47
31	34	51	24	56

18. 92	19. 27	20. 23	21. 34	22. 26
36	82	21	67	91
84	31	78	12	78
25	62	43	63	24

23. Write in columns and add 96, 36, 28, 91.

24. Find the sum of 46, 24, 81, 75.

25. In a school there are 85 pupils in the first grade, 73 in the second, 69 in the third, and 58 in the fourth. How many pupils are there in all?

26. Mary helped her father plant bulbs. They planted 96 tulips, 84 snowdrops, 72 daffodils, and 65 hyacinths. How many bulbs did they plant?

27. Find the sum of 43, 74, 86, 95.

1. *Add:*   The *sum* here is 1 *thousand,* 724.

896
547
281
――――
1724

> *A figure in the fourth place at the left of ones stands for* **thousands**.

2. *Tell what the separate figures stand for in:*

| 4625 | 3847 | 9645 | 8391 | 1648 | 5840 |
| 1196 | 2346 | 4267 | 6893 | 5908 | 2803 |

3. Read each of the numbers given above.

Write in figures:

4. Five thousand, three hundred fifty-six.

5. One thousand, three hundred thirty-eight.

6. Nine thousand, five hundred eighty-one.

Add and read results:

7.	8.	9.	10.	11.	12.
329	649	832	964	821	832
921	468	327	496	827	375
932	583	673	230	714	436
847	891	739	846	218	794

13.	14.	15.	16.	17.	18.
892	273	523	345	426	576
136	824	621	678	291	381
784	317	378	124	478	496
625	621	243	639	324	783

Add :

1.	2.	3.	4.	5.
246	963	879	922	368
398	487	631	138	91
56	329	47	467	476
271	86	232	83	87

6.	7.	8.	9.	10.
37	862	19	684	306
269	129	864	721	897
342	37	57	63	56
83	640	261	48	380
162	28	73	54	49

Write in columns and add :

11. $483 + 361 + 493.$
12. $634 + 86 + 198.$
13. $96 + 108 + 969.$
14. $365 + 810 + 74.$
15. $967 + 84 + 377.$
16. $346 + 934 + 83.$

17. $863 + 397 + 19.$
18. $37 + 390 + 846.$
19. $543 + 357 + 96.$
20. $684 + 733 + 309.$
21. $434 + 281 + 79.$
22. $643 + 71 + 386.$

23. $87 + 46 + 387 + 962 + 59.$
24. $138 + 264 + 93 + 167 + 84.$
25. $232 + 95 + 86 + 342 + 861.$
26. $298 + 743 + 54 + 117 + 938.$
27. $675 + 84 + 47 + 398 + 264.$
28. $392 + 847 + 36 + 281 + 96.$

1. When the circus came to town, there was a parade. There were 18 people playing in the bands, 16 driving the
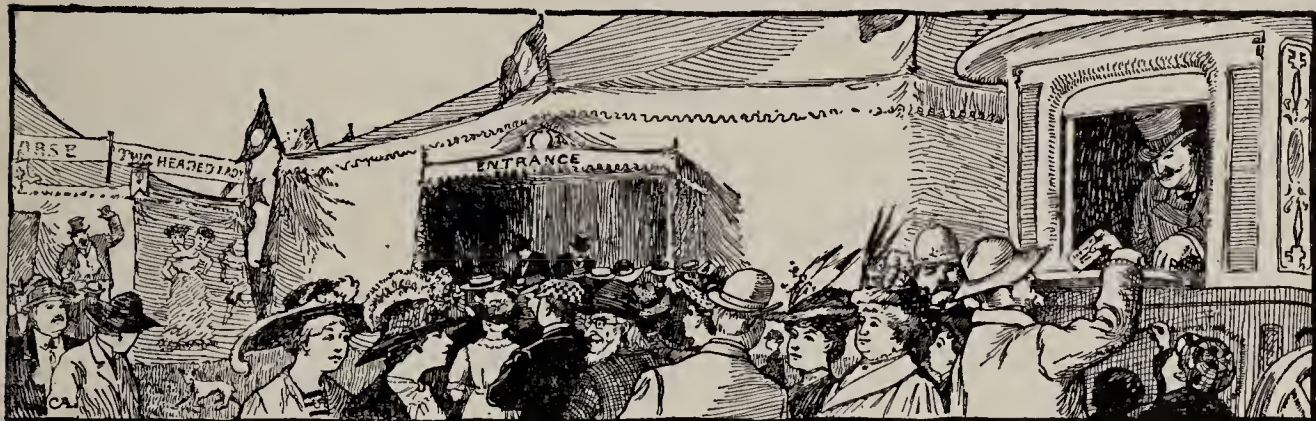
teams, 12 performers on horseback, 4 clowns, and 2 elephant drivers in the parade. How many people were in the parade?

2. In the wild-animal tent there were 27 large animals, such as elephants and camels. There were 18 monkeys, 9 leopards, and 49 other animals, such as bears and wolves, in the cages. How many animals were in the tent?

3. To feed all of the wild animals a day it took 975 pounds of hay, 128 pounds of carrots, 427 pounds of meat, and 346 pounds of other feed. How many pounds of feed did they eat in a day?

4. There were 18 dogs, 8 monkeys, 4 camels, 2 elephants, 3 bears, and 14 ponies that performed in the circus. How many animals performed?

5. There were 696 grown people and 975 children at the afternoon performance and 898 grown people and 745 children at the night performance. How many people saw the circus?

1. *See how quickly you can subtract:*

7	8	9	8	7	9	10	7
1	2	3	4	5	6	7	2
9	10	11	10	11	10	9	11
4	6	7	8	6	4	2	3
10	12	11	9	12	11	10	13
2	3	4	5	6	8	9	8
11	13	10	13	14	12	14	11
2	4	5	6	7	8	9	5
14	13	12	15	14	11	15	13
6	7	5	6	8	9	7	5
12	16	15	16	13	17	16	18
6	8	9	7	9	8	9	9

2. *Subtract quickly:*

14	12	13	10	16	13	15	12
8	9	6	7	9	8	6	7

16	14	13	11	17	15	18	15
8	7	9	5	8	8	9	9

1. If you buy something for 7 cents at the store, and give the clerk 10 cents, what change should you receive?

2. Tell the change from a dime for each of the purchases:

4 cents; 6 cents; 8 cents; 9 cents.

3. Tell the change from a quarter for each of the purchases:

6 cents; 9 cents; 7 cents; 8 cents.

4. John has 8 cents. How much more does he need to buy a 15-cent ball?

5. Ruth had 14 cents, and spent 5 cents of it for candy. How much had she left?

6. Charles had 12 marbles, and lost 7 of them. How many had he left?

7. Fred is 9 years old, and his cousin is 15 years old. Fred is how much younger than his cousin?

8. George got 16 papers, and sold 8 of them. How many had he left?

9. Dorothy needed 12 buttons for her doll's dress, and had only 9. How many more must she get?

10. Some boys took 11 sandwiches on a picnic trip, and there were 3 left. How many did they eat?

11. There are 16 boys in a school. If they form a baseball nine, how many will be left out of the team?

12. If you start on a 15-mile trip, and go 9 miles before lunch, how many miles farther have you to go?

Subtract :

1.	13	23	53	43	73	83	12	22	42	62
	9	9	9	9	9	9	8	8	8	8
2.	92	32	15	25	45	65	55	75	16	26
	8	8	9	9	9	9	9	9	8	8
3.	56	76	36	46	14	24	34	84	54	74
	8	8	8	8	5	5	5	5	5	5
4.	15	25	75	45	35	95	17	27	47	67
	7	7	7	7	7	7	8	8	8	8
5.	57	87	16	26	56	46	96	76	12	22
	8	8	7	7	7	7	7	7	7	7
6.	62	92	42	62	13	23	43	73	93	63
	7	7	7	7	4	4	4	4	4	4

NOTE. — Continue drills of this kind until pupils are expert.
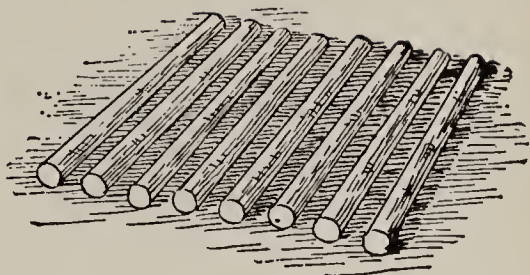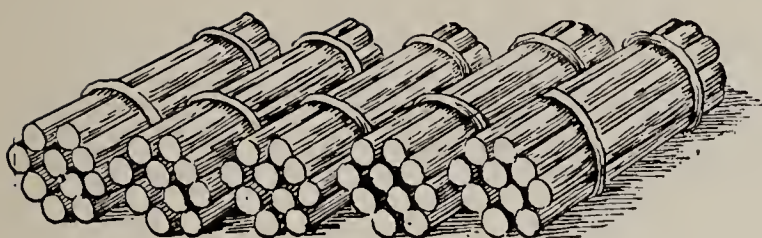
58
5 tens and 8 ones

From 58 subtract 23.

WORK
58
23
35

EXPLANATION OF WORK. — From 5 *tens* and 8 *ones* we are to take 2 *tens* and 3 *ones*. Three ones from 8 ones leave how many ones? Two tens from 5 tens leave how many tens?

NOTE. — Make the work concrete by using splints as shown above. Another method coming into use is to think of the number which added to the subtrahend gives the minuend. Thus, 3 and 5 are 8 ; 2 and 3 are 5.

Subtract, taking the ones from the ones first, and then the tens from the tens :

1. 68	**2.** 96	**3.** 86	**4.** 78	**5.** 63
23	43	24	27	41
6. 98	**7.** 89	**8.** 64	**9.** 96	**10.** 57
73	37	23	81	23
11. 46	**12.** 92	**13.** 49	**14.** 84	**15.** 46
25	31	26	31	35

16. A pony cost 85 dollars and a saddle cost 14 dollars. The pony cost how much more than the saddle?

17. A boy earned 64 cents on Friday and 96 cents on Saturday. How much more did he earn on Saturday than on Friday?

3 tens + 2 ones =   2 tens +   12 ones
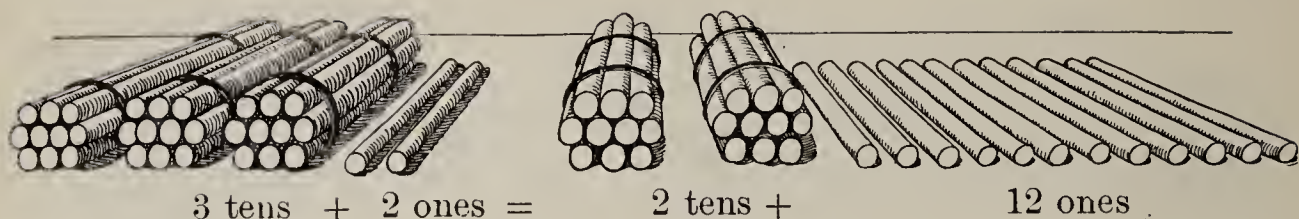
1. Take 3 bundles of 10 sticks each and 2 sticks, or 32 sticks.   Undo one of the bundles.   Then 3 bundles and 2 are equal to 2 bundles and 12.

2. Show in the same way that 4 *tens* and 3 *ones* are the same as 3 *tens* and 13 *ones*.

3. 54 is the same as 4 *tens* and —— *ones*.

4. 36 is the same as 2 *tens* and —— *ones*.

5. Write 63 in two other ways.

Thus, 6 *tens* + —— *ones* and 5 *tens* + —— *ones*.

6. Write each of the following in two other ways:

45   37   61   74   82   26   53

7. Read each of the following in two other ways:

39   65   28   91   44   70   50

8. *See if you can subtract three times in a minute :*

14	17	11	13	16	12	15	12	16	14
8	9	7	5	7	4	6	7	8	7
18	14	12	16	17	11	15	14	13	13
9	5	8	9	8	6	7	9	6	8

1. Subtracting the numbers in one column at a time, find the difference:

| 369 | 487 | 573 | 693 | 789 |
| 126 | 236 | 241 | 341 | 526 |

2. Subtract 37 from 65.

WORK

65	5 *tens* + 15 *ones*
37	3 *tens* + 7 *ones*
28	2 *tens* + 8 *ones*

EXPLANATION OF WORK. — Here we could not take 7 from 5, so we took 1 of the 6 tens and put with the 5 ones before subtracting, and said 7 ones from 15 ones, 8 ones; 3 tens from 5 tens, 2 tens.

NOTE. — Use splints to represent the minuend. Avoid the use of the term "borrow," as it has no real meaning.

While the method given above is the one in most general use, the Austrian method is coming into use and is perhaps the quicker. In using this method we think 7 and 8 are 15; 1 ten (from the 15) and 3 tens and 2 tens are 6 tens. Teach the method that seems preferable, but not both.

Subtract:

3.	4.	5.	6.	7.	8.
87	96	46	86	73	86
29	48	29	27	48	21

9.	10.	11.	12.	13.	14.
342	583	692	873	832	743
126	247	426	529	518	526

15.	16.	17.	18.	19.	20.
526	619	738	926	427	618
183	483	485	781	183	296

1. A pony can be bought for $65. A boy now has $42. How much more will he need to buy the pony?

2. If a pony costs $65 and a cart costs $18 less, how much does the cart cost?

3. A yard is 36 inches. Charles is 52 inches tall. How much more than a yard is that?

4. It is 179 miles from Chicago to Moline and 358 miles to Des Moines. How much farther from Chicago is Des Moines than Moline?

Subtract:

5.	6.	7.	8.	9.	10.
647	876	943	842	365	474
556	692	552	391	184	292

11. 564 − 372. 15. 632 − 521. 19. 6421 − 827.

12. 981 − 468. 16. 785 − 318. 20. 1283 − 349.

13. 283 − 85. 17. 841 − 649. 21. 6832 − 684.

14. 945 − 639. 18. 3412 − 516. 22. 951 − 327.

23.	24.	25.	26.	27.
3496	7162	8472	9116	7261
1873	1539	2968	1843	4839

28. There are 653 pupils in two schools. If there are 286 in one, how many in the other?

29. A boy earns $18 per month and his father earns $95. How much more does the father earn than the son?

1. 70 is the same as 6 *tens* and —— *ones*.

2. 400 is the same as 3 *hundred* and —— *tens*.

3. 900 is the same as —— *hundred* and —— *tens*.

4. 600 is the same as 5 *hundred*, 9 *tens*, and —— *ones*.

5. 300 is the same as —— *hundred*, 9 *tens*, and —— *ones*.

6. Write each of the following in two other ways:

    200   500   800   600   900

7. Subtract 126 from 400.

WORK

  400
  126
  ———
  274

EXPLANATION OF WORK. — There is nothing from which to take the 6 or the 2. So we change the 400 to 3 *hundred*, 9 *tens*, and 10 *ones*. Then 6 *ones* from 10 *ones* are 4 *ones*, 2 *tens* from 9 *tens* are 7 *tens*, and 1 *hundred* from 3 *hundred* are 2 *hundred*.

Subtract:

8.	9.	10.	11.	12.	13.
50	80	60	90	70	80
17	36	44	62	49	51

14.	15.	16.	17.	18.	19.
300	800	900	700	600	400
186	417	649	148	542	383

20.	21.	22.	23.	24.	25.
100	100	408	806	602	706
47	91	146	562	145	409

1. I bought goods worth 58 cents, and gave the clerk 75 cents. What change should I get?

2. Tell the change from 75 cents for each of the purchases:

      51 cents;   67 cents;   59 cents;   69 cents.

3. Tell the change from 50 cents for each of the purchases:

      27 cents;   34 cents;   19 cents;   42 cents.

4. Tell the change from a dollar, or 100 cents, for each of the purchases:

      42 cents;   67 cents;   89 cents;   35 cents.

5. Frank sold 139 pigeons from a flock of 200. How many had he left?

6 George planted 100 cabbage plants in his garden, and 17 of them died. How many lived?

7. Mr. Jones had 300 head of sheep on his farm, and sold 165 of them. How many did he keep?

8. Mary counted 200 roses on their bushes. She picked 25 of them. How many did she leave?

9. John's grandmother is 76 years old. If she lives, in how many years will she be 100 years old?

10. Fred weighs 62 pounds. That is how much less than 100 pounds?

11. Charles raised 200 pigeons. He sold 95 of them. How many did he have left?

12. Ruth gathered 100 eggs one week. The family ate 28 of them and sold the rest. How many did they sell?

Table for Daily Drill

Add the numbers from 1 to 9 inclusive to each number in the following table. Add by columns and by rows.

	A	B	C	D	E	F	G	H	I
1.	13	64	50	90	85	48	89	54	25
2.	74	91	33	20	63	16	72	78	10
3.	38	19	79	39	34	67	40	24	53
4.	56	32	92	14	57	26	35	88	43
5.	37	81	49	93	36	52	17	23	77
6.	51	15	96	59	27	83	65	99	68
7.	31	61	69	29	95	21	94	42	84
8.	70	87	28	98	18	41	55	80	75
9.	58	60	97	46	82	62	22	12	66
10.	47	11	71	30	86	73	45	76	44

Subtract all the numbers from 1 to 9 inclusive from each number in the table. Subtract by columns and by rows.

Subtract:

1. 3463	2. 5128	3. 6481	4. 7392
1946	2963	3927	5786

Add :

1. 64	2. 83	3. 35	4. 48	5. 74
86	96	76	57	86
92	28	98	96	98
47	34	43	87	24
25	22	76	24	39

6. 763	7. 175	8. 736	9. 342
284	628	281	796
976	931	197	381
831	763	648	428
427	247	234	155

10. $345 + 268 + 417 + 365 + 761 + 843.$

11. $126 + 847 + 964 + 327 + 842 + 365.$

12. $343 + 284 + 963 + 783 + 175 + 486.$

Subtract :

13. 847	14. 936	15. 381	16. 817	17. 927
726	193	196	628	185

18. 3465	19. 5684	20. 7285	21. 8347
1723	1936	1937	5629

22. $3847 - 1926$ 26. $1482 - 736$ 30. $3429 - 2918$

23. $1835 - 924$ 27. $1196 - 987$ 31. $2736 - 1928$

24. $1936 - 1384$ 28. $1542 - 839$ 32. $3684 - 2839$

25. $1285 - 839$ 29. $1684 - 976$ 33. $3251 - 2764$

1. How much will 2 bags of peanuts cost at 5 cents each? How much will 3 bags cost?

2. If ribbon is worth 6 cents a yard, what will 2 yards cost? What will 3 yards cost?

3. There are 7 days in a week. How many days in 2 weeks? In 3 weeks?

4. What will 3 eight-cent stamps cost?

5. How many boys in 2 baseball nines?

6. Find the cost of 2 balls at 8 cents each.

7. How many cents in 2 dimes? In 3 dimes?

8. *Give the sums quickly :*

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

9. *Give the sums quickly :*

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

Table of 2's and 3's

$2 \times 1 = 2$	$2 \times 6 = 12$	$3 \times 1 = 3$	$3 \times 6 = 18$
$2 \times 2 = 4$	$2 \times 7 = 14$	$3 \times 2 = 6$	$3 \times 7 = 21$
$2 \times 3 = 6$	$2 \times 8 = 16$	$3 \times 3 = 9$	$3 \times 8 = 24$
$2 \times 4 = 8$	$2 \times 9 = 18$	$3 \times 4 = 12$	$3 \times 9 = 27$
$2 \times 5 = 10$	$2 \times 10 = 20$	$3 \times 5 = 15$	$3 \times 10 = 30$

1. Tom sold 2 Saturday Evening Posts at 5 ¢ each, 2 copies of the News at 3 ¢ each, and 3 copies of the Tribune at 2¢ each. How much did he get for the Posts? For both copies of the News? For the Tribune?

2. Tom sold 7 papers in all. Harold sold twice as many. How many did Harold sell?

3. Robert sold 3 times as many papers as Tom. How many did he sell?

4. Harold sold 9 papers Friday and 3 times as many Saturday. How many did he sell Saturday?

5. One of Tom's customers bought 6 papers a week. How many did he buy in 2 weeks? In 3 weeks?

6. John delivered 8 morning papers and twice as many evening papers on a route each day. How many evening papers did he deliver?

7. If John made 9 cents profit a day in selling papers, how much did he make in 2 days? In 3 days?

8. *See how quickly you can give:*

2×6	3×7	3×9	2×5	2×8	3×6
2×9	2×7	3×8	2×4	3×5	3×4

1. At 2 cents each, how many pencils can you buy for a dime?

2. At 3 cents each, how many peaches can you buy for 6 cents? How many for 9 cents? How many for 12 cents?

3. At 2 cents each, how many picture postal cards can you buy for 8 cents? How many for 10 cents? How many for 12 cents? How many for 14 cents?

4. How many two-cent stamps can you buy for 16 cents? How many for 18 cents? How many for 20 cents?

5. How many quarts in 6 pints? In 8 pints? In 16 pints? In 20 pints?

6. How many yards in 6 feet? In 9 feet? In 12 feet?

7. In 15 feet how many yards? In 27 feet?

8. Give quickly:

$4 \div 2$	$10 \div 2$	$14 \div 2$	$6 \div 3$	$9 \div 3$	$15 \div 3$
$6 \div 2$	$20 \div 2$	$12 \div 2$	$12 \div 3$	$18 \div 3$	$27 \div 3$
$8 \div 2$	$16 \div 2$	$18 \div 2$	$21 \div 3$	$24 \div 3$	$30 \div 3$

Table of 2's and 3's

$2 \div 2 = 1$	$12 \div 2 = 6$	$3 \div 3 = 1$	$18 \div 3 = 6$
$4 \div 2 = 2$	$14 \div 2 = 7$	$6 \div 3 = 2$	$21 \div 3 = 7$
$6 \div 2 = 3$	$16 \div 2 = 8$	$9 \div 3 = 3$	$24 \div 3 = 8$
$8 \div 2 = 4$	$18 \div 2 = 9$	$12 \div 3 = 4$	$27 \div 3 = 9$
$10 \div 2 = 5$	$20 \div 2 = 10$	$15 \div 3 = 5$	$30 \div 3 = 10$

NOTE. — The introduction of " written multiplication " at this time, so as to give a wider range for drill work while fixing the tables, will be found a great advantage. Present the subject so as to show that multiplication saves the work of addition when the addends are equal.

1. *Add:*

84	42	24	41	63	34	94
84	42	24	41	63	34	94

When the numbers to be added are all alike, there is a shorter way to get the answer; this new way is called **multiplication.**

2. Find 2 times 84. That is, multiply 84 by 2.

WORK

$$\begin{array}{r} 84 \\ \times\, 2 \\ \hline 168 \end{array}$$

EXPLANATION. — Instead of actually seeing two 4's, as in Exercise 1, we *think* two 4's are 8 and write 8. Next we *think* two 8's are 16 and write 16 under the tens.

The answer in multiplication is called the **product.**

3. *Find the products of :*

64	73	83	92	54	91	82
× 2	× 2	× 2	× 2	× 2	× 2	× 2

4. *Find the products of :*

124	243	344	321	432	541	642
× 2	× 2	× 2	× 2	× 2	× 2	× 2

5. Write Exercise 4 as exercises in addition and add.

1. Find $345 + 345 + 345$.

WORK

345
345
345

1035

What is the sum of the first column? What do you write down? What do you do with the 1 *ten*?

How do you get the 3 under the second column? How is the 10 under the third column obtained?

2. Find the product of 3×345.

WORK

345
$\times 3$

1035

EXPLANATION. — Instead of writing 345 three times, as in Exercise 1, we write it once, with $\times 3$ below. Then we *think* $3 \times 5 = 15$, and write 5. Then we *think* $3 \times 4 = 12$, which with the 1 from the 15 makes 13. How do we get the 10?

3. *Find the product of :*

46	84	96	54	75	57	29	63	17
$\times 3$	$\times 3$	$\times 3$	$\times 3$	$\times 3$	$\times 3$	$\times 3$	$\times 3$	$\times 3$

4. *Find the product of :*

386	574	847	326	894	765	961
$\times 2$	$\times 3$	$\times 2$	$\times 3$	$\times 2$	$\times 3$	$\times 3$

5. Ralph's father bought two ponies for him at $86 each. How much did the two cost? In what two ways can you find the answer?

6. John's father has 3 acres of potatoes. If he digs 136 bushels from each acre, how many bushels in all?

7. Last year James raised 46 pigeons. This year he expects to raise 3 times as many. How many does he expect to raise?

1. *How many :*

4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9

2. $4 \times 4 = ?$ $4 \times 5 = ?$ $5 \times 4 = ?$ $4 \times 6 = ?$ $6 \times 4 = ?$

3. $4 \times 7 = ?$ $7 \times 4 = ?$ $4 \times 8 = ?$ $8 \times 4 = ?$ $9 \times 4 = ?$

Learn :

$4 \times 1 = 4$	$4 \times 4 = 16$	$4 \times 7 = 28$
$4 \times 2 = 8$	$4 \times 5 = 20$	$4 \times 8 = 32$
$4 \times 3 = 12$	$4 \times 6 = 24$	$4 \times 9 = 36$

4. *Give the products quickly :*

3	5	4	3	9	8	4	9	2
4	3	6	7	2	3	2	3	7

3	2	9	2	4	2	6	4	6
3	3	4	5	7	2	3	8	2

5. *Find the products of :*

21	42	61	76	87	93	57
×4	×4	×4	×4	×4	×4	×4

6. Ralph has a flock of hens. He gets an average of 78 eggs a week. How many will he get in 4 weeks?

7. A man bought 4 building lots at $945 each. How much did the four cost?

1. *Find the products of:*

68	96	264	582	376
× 2	× 2	× 2	× 2	× 2

2. *Find the products of:*

92	68	147	426	968
× 3	× 3	× 3	× 3	× 3

3. *Find the products of:*

62	78	319	486	829
× 4	× 4	× 4	× 4	× 4

4. *Find the products of:*

749	868	625	718	298
× 4	× 4	× 4	× 4	× 4

5. *Find the products of:*

402	503	209	608	707
× 4	× 3	× 2	× 4	× 4

6. *Find the products of:*

180	760	490	600	900
× 4	× 4	× 3	× 2	× 4

7. If I ride an average of 36 miles a day on my bicycle, how far will I ride in 4 days?

8. Mr. Johnson's field produced 87 bushels of corn an acre. How much did 4 acres yield?
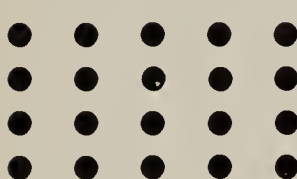
9. A man earns $165 a month. How much does he earn in 4 months?

1. Four 3's are how many? $4 \times 3 = ?$

2. How many 3's in 12? $12 \div 3 = ?$

We get the **division tables** from the **multiplication tables**.

3. Four 5's are how many? $4 \times 5 = 20$.

4. How many dots in 1 row?   In 4 rows?

5. How many dots in 1 column?   In 5 columns?

6. The dots show that 4 fives and 5 fours are equal.

7. Show that $2 \times 3 = 3 \times 2$.   That $3 \times 4 = 4 \times 3$.

8. How many 3's in 12?   How many 4's in 12?

9. How many 4's in 24?   How many 6's in 24?

We show that there are 6 fours in 24 in two ways:

$$24 \div 4 = 6; \quad 4)\overline{24} \quad \text{This is called \textbf{Division}.}$$
$$6$$

When we divide one number by another, the result is the **quotient**.

10. Give the quotients of :

$4)\overline{28}$ $4)\overline{36}$ $4)\overline{32}$ $4)\overline{16}$ $4)\overline{12}$ $4)\overline{20}$ $4)\overline{24}$

To find one fourth of a number we divide it by 4.

11. Find one fourth of : (one fourth is written $\frac{1}{4}$)

    8   12   16   20   24   28   32   36

12. $\frac{1}{4}$ of $20 = ?$ $\frac{1}{4}$ of $16 = ?$ $\frac{1}{4}$ of $32 = ?$ $\frac{1}{4}$ of $36 = ?$

Pints, Quarts, and Gallons

NOTE. — Pints and quarts have been studied. To these the gallon is added. Supply the class with actual measures. Sand is more convenient than water.

1. How many pints in a quart? A pint is what part of a quart? At 5 cents a pint, how much will 2 quarts of milk cost?

2. Using a quart measure to carry the sand, fill a gallon measure. How many quarts does it take?

> 2 pints make 1 quart; written, 2 pt. = 1 qt.
>
> 4 quarts make 1 gallon; written, 4 qt. = 1 gal.

3. How many quarts in 2 gallons? In 3 gallons?

4. *Copy and fill the blanks:*

2 gal. = —— qt. 7 gal. = —— qt. 5 gal. = —— qt.
3 gal. = —— qt. 9 gal. = —— qt. 8 gal. = —— qt.
4 gal. = —— qt. 6 gal. = —— qt. 10 gal. = —— qt.

5. *Copy and fill the blanks:*

2 qt. = —— pt. 8 qt. = —— pt. 5 gal. = —— qt.
8 qt. = —— gal. 16 qt. = —— gal. 6 qt. = —— pt.
8 pt. = —— qt. 20 qt. = —— gal. 26 gal. = —— qt.
12 pt. = —— qt. 6 pt. = —— qt. 24 qt. = —— gal.

1. At 10 cents a quart, what will a pint of milk cost?

2. At 32 cents a gallon, what will a quart of vinegar cost?

3. Some children kept a lemonade stand at a fair. They had large glasses that held 1 pint each. If they sold 2 gallons, how many glasses did they sell? If they sold 3 gallons, how many glasses did they sell? How many glasses in 4 gallons?

4. A dairyman sold 40 quarts of milk to a family in one month. How many gallons was this?

5. Tell how many gallons in

| 8 quarts | 20 quarts | 24 quarts | 28 quarts |
| 16 quarts | 12 quarts | 32 quarts | 36 quarts |

6. From 2 gallons of milk how many quarts can be sold? How many pints?

7. Mrs. Smith buys 2 quarts of milk a day. How many quarts does she buy in 6 days? How many gallons is that?

8. Mary's mother put up 16 pints of grape juice. How many quarts was that? How many gallons?

9. If Mrs. Adams is going to put up 3 gallons of grape juice, how many quart bottles will she need? If she puts it in pint bottles, how many will she need?

10. 4 ¢ a pint for milk is how much a quart? How much a gallon?

11. 18 ¢ a pint for cream is how much a quart?

Dry Measure

Some grains, fruits, and vegetables are measured by the **quart, peck,** or **bushel.** Have you ever seen these measures?

---

8 quarts make 1 peck; written, 8 qt. = 1 pk.
4 pecks make 1 bushel; written, 4 pk. = 1 bu.

---

1. How many quarts in 2 pecks? How many quarts in 4 pecks or 1 bushel?

2. Henry gathered 16 quarts of nuts. How many pecks did he gather?

3. How many quarts in 2 pecks?

4. If Howard gives his pony 2 quarts of oats at a feed, how many feeds in one peck? In 2 pecks?

5. If I feed my horse a peck of oats a day, how long will 6 bushels last? How long will 10 bushels last?

6. A farmer gathered 10 bushels of apples from a tree and put them in peck baskets for market. How many baskets did he need?

7. I can buy cooking apples for 30 cents a peck. How much is that for a bushel?

8. How many quarts in a bushel?

9. A gardener took 32 1-peck baskets of tomatoes to market one day. How many bushels was that? If he got $1 a bushel for them, how much money did he get?

1. If Mary gives her pet rabbit 3 carrots each **day,** how many will she give him in a week or 7 days?

2. How many will she give him in 5 days? In 6 days? In 8 days? In 4 days? In 9 days?

3. If she feeds the rabbit 2 carrots each day, how long will 8 carrots last? How long will 12 last? How long will 16 last? How long will 18 last?

4. If she feeds him 3 each day, how long will 9 last? How long will 12 last? How long will 21 last? How long will 27 last? How long will 15 last? · How long will 24 last?

5. Give the quotients:

$6 \div 3$	$12 \div 3$	$14 \div 2$	$8 \div 2$	$10 \div 2$
$9 \div 3$	$12 \div 2$	$16 \div 2$	$21 \div 3$	$18 \div 2$
$6 \div 2$	$15 \div 3$	$18 \div 3$	$27 \div 3$	$24 \div 3$

6. If a boy earns 3 dimes each week, how many will he earn in 3 weeks? In 5 weeks? In 8 weeks? In 9 weeks? In 7 weeks? In 6 weeks?

7. If Alice feeds her pet squirrel 6 nuts each meal, how many will she feed him in 2 meals? In 3 meals? In 4 meals?

8. If she feeds him 6 nuts each meal, how many meals will 18 make? How many meals will 24 make? How many will 12 make?

1. George feeds his hens 4 pints of corn each morning. How many pints will he feed them in a week (7 days)?

2. How long will 12 pints last? How long will 16 pints last?

3. How many pints will he feed in 5 days? In 4 days? In 8 days? In 3 days? In 9 days?

4. At 4 pints each day, how long will 20 pints last? How long will 32 pints last? How long will 36 pints last?

5. At 6 pints each day, how many pints would he feed in 3 days? In 4 days? In 2 days?

6. At 5 pints a day, how long will 15 pints last? How long will 20 pints last?

7. If each hen weighs 5 pounds, what will 4 hens weigh? What will 3 hens weigh?

8. If the feed costs 6 cents a day, what will it cost for 3 days? For 4 days? For 2 days?

Table of 4's

$4 \times 1 = 4$	$4 \times 6 = 24$	$4 \div 4 = 1$	$24 \div 4 = 6$
$4 \times 2 = 8$	$4 \times 7 = 28$	$8 \div 4 = 2$	$28 \div 4 = 7$
$4 \times 3 = 12$	$4 \times 8 = 32$	$12 \div 4 = 3$	$32 \div 4 = 8$
$4 \times 4 = 16$	$4 \times 9 = 36$	$16 \div 4 = 4$	$36 \div 4 = 9$
$4 \times 5 = 20$	$4 \times 10 = 40$	$20 \div 4 = 5$	$40 \div 4 = 10$

1. Can you name some things that are sold by the dozen?

2. How many things make a dozen?

12 things make a dozen.
12 = 1 doz.

3. How many in half a dozen? In one fourth of a dozen?

4. At 20 cents a dozen, how much will 6 peaches cost?

5. At 40 cents a dozen, what will 3 oranges cost?

6. If you buy papers at 9 cents a dozen and sell them for 1 cent each, how much do you make on a dozen?

7. If you buy a dozen oranges and give away 4, how many have you left?

8. What will half a dozen eggs cost at 2 cents each?

9. At 5 cents each, how much will one fourth of a dozen pears cost?

10. At 6 cents each, what will one fourth of a dozen oranges cost?

1. Name some things bought by the pound.

2. What measure does the butcher use? The grocer?

Articles that weigh less than a pound are weighed by the **ounce**.

> **16 ounces make 1 pound**
> **16 oz. = 1 lb.**

3. How many ounces in $\frac{1}{2}$ pound of butter?

4. How many ounces in $\frac{1}{4}$ pound of pepper?

5. At 20 cents a pound, how much will 8 oz. of nuts cost?

6. At 24 cents a pound, how much will 8 oz. of nuts cost?

7. How many 2-oz. packages of spices can be made from 1 lb.?

8. When chocolate candy is worth 40 cents a pound, how much will 4 ounces cost?

9. At 20 cents a pound, how many ounces of candy can you get for a dime? How much for a nickel?

10. If you ask for $\frac{1}{4}$ pound of candy, how many ounces will you get? If you ask for $\frac{1}{2}$ pounds?

1. How many:

5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9

2. $5 \times 5 = ?$ $5 \times 6 = ?$ $5 \times 7 = ?$ $5 \times 8 = ?$ $5 \times 9 = ?$

3. $6 \times 5 = ?$ $7 \times 5 = ?$ $8 \times 5 = ?$ $9 \times 5 = ?$

4. Give the products quickly:

5	7	9	3	5	5	2	5
6	5	5	5	8	4	5	5

Note. — Let the pupil see that the number of tens in each product is half of the number that is taken 5 times, and that if 1 remains, the product ends in 5. When the table is formed, merely point out that this is so, as it will aid in remembering the table of 5's.

5. Count by fives. Say 5, 10, 15, and so on to 50.

6. At 5 cents each, how much will 7 oranges cost?

7. At 5 cents a quart, how much will 9 quarts of milk cost?

8. Henry spent 25 cents for pears at 5 cents each. How many did he buy?

9. If I paid 5 cents each for 6 car rides to-day, how much did I spend for car rides?

10. Give quotients quickly:

$25 \div 5$	$35 \div 5$	$45 \div 5$	$30 \div 5$	$40 \div 5$
$\frac{1}{5}$ of 25	$\frac{1}{5}$ of 35	$\frac{1}{5}$ of 45	$\frac{1}{5}$ of 30	$\frac{1}{5}$ of 40

1. How much did you pay for your pencil?

2. How much will 5 pencils cost at this price? How much will 4 cost?

3. How much does your mother pay for a quart of milk? How many quarts does she buy in one day? How much does it cost at this price?

4. If milk is 5 cents a quart, how much will a quart each day for a week cost?

5. When strawberries are 9 cents a quart, how many quarts can I buy for 18 cents? How many quarts for 27 cents?

6. At 5 cents a pint, how much will 2 quarts of nuts cost?

7. At 5 cents a yard, how much will 8 yards of braid cost?

8. When 3 oranges cost 15 cents, how much is that apiece? At this price, how much will 7 cost?

9. Mary has a garden, and sold 8 dozen carrots to-day for 5 cents a dozen. How much did she get for them?

Table of 5's

$5 \times 1 = 5$	$5 \times 6 = 30$	$5 \div 5 = 1$	$30 \div 5 = 6$
$5 \times 2 = 10$	$5 \times 7 = 35$	$10 \div 5 = 2$	$35 \div 5 = 7$
$5 \times 3 = 15$	$5 \times 8 = 40$	$15 \div 5 = 3$	$40 \div 5 = 8$
$5 \times 4 = 20$	$5 \times 9 = 45$	$20 \div 5 = 4$	$45 \div 5 = 9$
$5 \times 5 = 25$	$5 \times 10 = 50$	$25 \div 5 = 5$	$50 \div 5 = 10$

1. *Give quickly :*

5×4	5×6	5×7	5×9	5×3
5×2	5×8	5×5	5×10	8×5

2. *Give quickly :*

$5)\underline{20}$	$5)\underline{35}$	$5)\underline{55}$	$5)\underline{40}$	$5)\underline{25}$
$5)\underline{50}$	$5)\underline{45}$	$5)\underline{10}$	$5)\underline{30}$	$5)\underline{15}$

3. *Give quickly :*

$\frac{1}{5}$ of 30	$\frac{1}{5}$ of 45	$\frac{1}{5}$ of 25	$\frac{1}{5}$ of 35
$\frac{1}{5}$ of 15	$\frac{1}{5}$ of 40	$\frac{1}{5}$ of 50	$\frac{1}{5}$ of 20

4. *Find the products of :*

71	49	125	418	643
$\times 5$	$\times 5$	$\times 5$	$\times 5$	$\times 5$

5. *Find the products of :*

916	187	508	760	800
$\times 5$	$\times 5$	$\times 5$	$\times 5$	$\times 5$

6. If I set 75 tomato plants in each row, how many plants will it take for 5 rows?

7. A farmer buys 5 horses at $165 apiece. What do all of them cost?

8. An automobile party drove an average of 129 miles a day for 5 days. How far did they go in all?

9. If the expenses of a family are $86 a month, how much will they be for 5 months?

1. *Give products quickly :*

1	2	3	1	2	2	1	5	4
2	2	7	8	9	3	4	8	6
2	3	4	2	9	4	3	4	2
8	3	4	7	5	7	8	9	4
1	4	1	3	3	2	3	1	5
9	5	7	6	9	5	5	6	5
5	1	2	5	3	1	5	4	3
5	3	6	7	4	5	6	8	9

2. *Find the products of :*

82	73	64	95	17	28	39	41
5	5	5	5	5	5	5	5

Find the products of :

3. 2×96.
4. 2×78.
5. 2×65.
6. 2×43.
7. 3×24.
8. 3×46.
9. 3×82.
10. 3×31.
11. 3×53.

12. 3×75.
13. 3×93.
14. 3×91.
15. 4×85.
16. 4×76.
17. 4×49.
18. 4×38.
19. 5×86.
20. 5×97.

21. 5×79.
22. 3×99.
23. 4×89.
24. 5×77.
25. 4×97.
26. 5×71.
27. 3×827.
28. 4×376.
29. 5×781.

30. 2×989.
31. 3×635.
32. 4×493.
33. 5×397.
34. 4×563.
35. 3×769.
36. 5×849.
37. 4×718.
38. 5×633.

CHOCOLATE CARAMELS	CREAM CANDY
3 lb. brown sugar	Whites of 4 eggs
$\frac{1}{4}$ lb. butter	6 tablespoonfuls cold water
$\frac{1}{2}$ lb. grated chocolate	4 lb. granulated sugar
1 pt. cream or milk	$\frac{1}{4}$ lb. nuts
$\frac{1}{2}$ lb. granulated sugar	Vanilla flavor
Vanilla flavor	

1. Some children made chocolate caramels and cream candy from these receipts. For the caramels, the brown sugar costs 5 ¢ a pound. How much did the 3 pounds cost?

2. At 28 ¢ a pound, how much did the butter for the caramels cost?

3. Chocolate costs 40 ¢ a pound. How much did the chocolate cost?

4. They used milk in the caramels that cost 8 ¢ a quart. How much did the milk cost?

5. At 6 ¢ a pound, how much did the granulated sugar cost?

6. They cooled the caramels in two pans each 8 inches long and 5 inches wide. If they cut the caramels into pieces 1 inch square, how many caramels will they have in each pan? How many in both pans?

7. For the cream candy, the eggs cost 24 ¢ a dozen, the sugar 6 ¢ a pound, and the nuts 36 ¢ a pound. Find the cost of the cream candy.

1. How many inches in a foot? $\frac{1}{2}$ of a foot is how many inches?

2. $\frac{1}{2}$ ft. = —— in.; $\frac{1}{3}$ ft. = —— in.; $\frac{1}{4}$ ft. = —— in.

3. How many feet in 1 yard? A foot is what part of a yard?

4. Tell how many yards in each of the following:
6 ft.; 12 ft.; 9 ft.; 15 ft.; 21 ft.; 18 ft.

5. When ribbon is 24 cents a yard, how much is 1 foot worth?

6. Mary bought 4 ft. of ribbon at 15 cents a yard. How much did it cost?

7. Frank made 6-inch badges from 8 feet of ribbon. How many did he make?

8. How many quart bottles of milk can a dealer fill from a gallon of milk? How many from 2 gallons? From 3 gallons? From 4 gallons? From 5 gallons?

9. Give the number of quarts in 7 gallons; in 8 gallons; in 9 gallons; in 10 gallons.

10. How many times can you fill a peck measure from 1 bushel of oats? From 5 bushels? From 10 bushels?

11. How many ounces in $\frac{1}{2}$ pound? In $\frac{1}{4}$ pound?

12. How many things in $\frac{1}{2}$ dozen? In $\frac{1}{4}$ dozen?

13. At 40 cents a dozen, how much will $\frac{1}{2}$ dozen oranges cost?

NOTE. — Make or have the pupils propose additional similar problems regarding the materials used in work in textiles, bookbinding, or box making.

1. The figures on a clock face usually are the **Roman Numerals.** Show how to make them from 1 to 12.

2. It takes the long hand of a clock 5 minutes to go from one number to the next. How long does it take for it to go from XII to II? From XII to III?

3. When it is exactly 3 o'clock, where is the long hand? Where is the short hand?

4. Starting with the long hand at XII and the short hand at IX, give the time as the long hand moves to I, II, III, on around to XII again.

5. As your teacher points to the figures on the clock face count the minutes past any hour.

6. Count around a clock face as in Exercise 5 and find how many minutes in 1 hour.

> 60 minutes make 1 hour
> 60 min. = 1 hr.
> 24 hours make 1 day
> 24 hr. = 1 da.

7. You should sleep $\frac{1}{3}$ of your time and 2 hours more each day. How many hours should you sleep each day?

8. If you go to bed at 8 o'clock, when should you get up?

Give quotients quickly :

1. 4)$\underline{24}$ 3)$\underline{27}$ 5)$\underline{25}$ 4)$\underline{28}$ 2)$\underline{18}$ 3)$\underline{21}$ 2)$\underline{16}$

2. $\frac{1}{2}$ of 12 $\frac{1}{4}$ of 24 $\frac{1}{3}$ of 18 $\frac{1}{5}$ of 20 $\frac{1}{3}$ of 18

Written Division

3. Divide 86 by 2.

WORK	
2)$\underline{86}$	EXPLANATION. — $\frac{1}{2}$ of 8 *tens* is 4 *tens* ; $\frac{1}{2}$ of 6 *ones* is
43	3 *ones*. So 86 ÷ 2 is 4 *tens* and 3 *ones*, or 43.

Find the quotients :

4. 2)$\underline{24}$ 2)$\underline{26}$ 2)$\underline{42}$ 2)$\underline{44}$ 2)$\underline{62}$ 2)$\underline{84}$ 2)$\underline{86}$

5. 3)$\underline{39}$ 3)$\underline{63}$ 3)$\underline{66}$ 3)$\underline{96}$ 4)$\underline{48}$ 4)$\underline{84}$ 4)$\underline{88}$

6. 2)$\underline{242}$ 2)$\underline{486}$ 2)$\underline{862}$ 3)$\underline{369}$ 3)$\underline{696}$ 4)$\underline{488}$

7. 2)$\underline{124}$ 3)$\underline{156}$ 2)$\underline{144}$ 4)$\underline{168}$ 3)$\underline{189}$ 5)$\underline{105}$

8. 4)$\underline{204}$ 5)$\underline{155}$ 5)$\underline{255}$ 2)$\underline{4268}$ 3)$\underline{6396}$

9. 2)$\underline{208}$ 4)$\underline{404}$ 3)$\underline{306}$ 5)$\underline{505}$ 4)$\underline{804}$ 3)$\underline{906}$

10. 4)$\underline{840}$ 2)$\underline{680}$ 3)$\underline{960}$ 4)$\underline{440}$ 3)$\underline{390}$ 4)$\underline{240}$

11. *Give* $\frac{1}{2}$ *of :* 44, 62, 86, 48, 66, 84, 28, 642.

12. *Give* $\frac{1}{3}$ *of :* 36, 39, 63, 66, 93, 69, 123, 156.

NOTE. — Let the first written division be the kind shown here, in which there is no remainder left after any step of the division. Resort to splints if necessary. Here we are seeking to image number represented by figures. Discard the splints or other devices as soon as possible.

Give quotients and remainders:

1. 3)17.

EXPLANATION. — We cannot get $\frac{1}{3}$ of 17 exactly. Since 17 is 15 + 2, we take $\frac{1}{3}$ of 15, which is 5, and leave the 2. So the *quotient* is 5 and the *remainder* 2.

2.   2)7   2)9   3)5   4)9   3)7   5)8   5)9

3.   3)14   4)18   5)14   4)21   5)19   3)23   4)22

4.   3)20   5)31   4)33   3)29   5)32   5)47   4)35

5.   2 *tens* and 4 *ones* are how many *ones?*

6.   3 *tens* and 6 *ones* are how many *ones?*

7.   52 = 5 *tens* + —— *ones*, or 4 *tens* + —— *ones*.

8.   84 = 8 *tens* + —— *ones*, or 6 *tens* + —— *ones*.

9.   Divide 78 by 3.

WORK

3)78
——
26

EXPLANATION. — 78 = 7 *tens* + 8 *ones*, or 6 *tens* + 18 *ones*. $\frac{1}{3}$ of 6 *tens* = 2 *tens;* $\frac{1}{3}$ of 18 *ones* = 6 *ones*.   So $\frac{1}{3}$ of 78 = 2 *tens* + 6 *ones*, or 26.

In dividing we say $\frac{1}{3}$ of 7 *tens* = 2 *tens*, and 1 *ten* remaining; 1 *ten* + 8 *ones* = 18 *ones;* $\frac{1}{3}$ of 18 *ones* = 6 *ones*.   Quotient, 26.

Find the quotients:

10.   2)32   2)36   2)52   2)58   2)76   2)92   2)194

11.   3)42   3)45   3)51   3)57   3)72   3)81   3)825

12.   4)52   4)64   4)72   4)96   5)65   5)75   5)915

Find the quotients :

1.	$134 \div 2$	**6.**	$725 \div 5$	**11.**	$1348 \div 4$
2.	$625 \div 5$	**7.**	$984 \div 4$	**12.**	$2345 \div 5$
3.	$476 \div 4$	**8.**	$376 \div 4$	**13.**	$6795 \div 3$
4.	$378 \div 3$	**9.**	$831 \div 3$	**14.**	$4716 \div 3$
5.	$648 \div 4$	**10.**	$698 \div 2$	**15.**	$8735 \div 5$

Problems

16. How much will 1 orange cost when 5 cost 50 cents ?

17. I paid 18 cents for 3 pencils. How much was that for each ?

18. When milk sells for 5 cents a quart, how much can be bought for 40 cents ?

19. If you are in school 5 hours each day, how many hours are you in school in 5 days ?

20. A dealer paid $3 a dozen for caps. How many dozen could he buy for $21 ?

21. When I pay $5 for a dozen hens, how many dozen will $35 buy ?

22. If a boy lives 5 blocks from school, how many blocks must he walk in going to school twice a day and returning?

23. At 4 cents a pint, how much are 9 pints of chestnuts worth ?

24. At 5 cents a quart, what must your mother pay for 9 quarts of milk ?

1. Charles helped his father plant and tend the garden. They set out 144 cabbage plants in 4 equal rows. How many in each row?

2. They set 72 tomato plants in 3 equal rows. How many in each row?

3. They set out 228 sweet potato plants, but $\frac{1}{4}$ of them wilted and died. How many did they have to replant?

4. It took Charles 45 minutes to hoe 3 rows of beans. How long would it take him to hoe one row? If there were 5 rows of beans, how long would it take him to hoe all of them?

5. Charles got $\frac{1}{3}$ of the produce of the garden as his own. If they gathered 429 pounds of tomatoes, how many pounds did he get?

6. They sold $141 worth of produce from the garden during the season. If Charles got $\frac{1}{3}$ of this, how much did he get?

7. A gardener and his son sold $576 worth of produce one year. What was the son's share if he got $\frac{1}{4}$ of it? If he got $\frac{1}{6}$ of it?

See how many sums you can give in 1 minute :

1. 3	4	2	3	4	2	4	2	1	3
5	5	4	6	3	3	5	2	5	4
1	9	8	6	6	8	7	9	9	8

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

3. 2	2	3	2	2	1	4	1	4	1
7	1	3	4	6	8	5	6	4	1
5	8	6	9	7	3	8	7	8	9

4. 1	4	1	1	6	9	4	4	6	4
4	3	6	8	1	1	4	3	2	5
9	4	5	6	8	2	9	7	8	2

5. 4	5	1	3	3	5	6	6	1	4
2	3	5	3	3	4	2	1	4	4
3	2	4	4	5	2	2	5	6	3

Give the sums without adding :

1. 3	6	8	2	5	7	1	4	9	10
3	6	8	2	5	7	1	4	9	10
3	6	8	2	5	7	1	4	9	10

2. 4	1	10	8	9	6	7	2	5	3
4	1	10	8	9	6	7	2	5	3
4	1	10	8	9	6	7	2	5	3
4	1	10	8	9	6	7	2	5	3

In the numbers below first observe the sum of the numbers that are alike, then add the other numbers. Thus in Ex. 1, observe that three 6's are 18 and add 2.

1.	2.	3.	4.	5.	6.	7.	8.	9.
6	6	8	5	7	5	6	9	6
6	6	5	7	7	7	3	4	8
6	6	5	5	2	7	3	4	8
2	9	5	5	7	7	3	4	8

10.	11.	12.	13.	14.	15.	16.	17.	18.
2	9	8	9	6	5	4	8	9
4	9	8	6	6	9	7	8	9
4	9	3	9	4	5	4	2	3
4	3	8	9	6	5	4	2	3

Give the sums quickly :

19.	16	18	19	17	15	12	13	11
	7	4	6	4	9	6	7	9

20.	11	14	19	15	13	18	17	16
	8	6	5	7	8	5	7	5

See how many you can copy and add in 3 minutes :

21.	22.	23.	24.	25.	26.	27.	28.
48	67	91	58	97	97	57	84
18	61	18	96	86	87	89	93
42	17	98	48	53	46	63	78
18	57	87	78	99	91	41	64

See how many you can subtract in 1-minute:

1. 9	16	8	13	7	9	16	14	11
2	9	5	7	3	2	8	9	8

2. 15	11	16	14	12	17	10	13	18
8	6	7	8	9	9	6	8	9

3. 16	13	11	17	14	15	14	16	12
9	7	7	8	9	6	7	8	6

4. 21	34	19	36	41	29	38	23	38
9	6	5	8	7	6	9	7	6

5. 42	53	28	64	43	32	55	26	41
8	7	9	8	5	6	7	9	7

See how many you can copy and subtract in 5 minutes:

6. 93	**7.** 81	**8.** 48	**9.** 64	**10.** 85	**11.** 72
27	65	19	59	67	36

12. 482	**13.** 516	**14.** 827	**15.** 512	**16.** 729
137	172	362	248	464

17. 824	**18.** 620	**19.** 480	**20.** 602	**21.** 506
596	345	164	441	249

22. 963	**23.** 906	**24.** 870	**25.** 830	**26.** 708
729	534	195	287	195

27. 630	**28.** 708	**29.** 309	**30.** 960	**31.** 815
486	195	186	584	569

1. Frank went with his father on an automobile tour. One day they traveled 98 miles, the next day 87 miles, and the third day 116 miles. How far did they go in the three days?

2. A man owns four farms. One contains 126 acres, another 97 acres, another 85 acres, and the fourth 156 acres. How many acres in all?

3. If he sold 186 acres of this land, how much would he have left?

4. John raised 235 pigeons, and sold 168 of them. How many did he keep?

5. Mr. Bartlett planted an orchard of fruit trees. There were 68 apple trees, 95 peach trees, 48 pear trees, and 97 trees of other kinds. How many trees in all?

6. Of these trees 39 died. How many trees lived?

7. He got 49 bushels of apples from the apple trees the sixth year of their growth, 67 bushels the seventh year, 118 bushels the eighth year, and 124 bushels the ninth year. How many bushels did he get in all four years?

8. How many more bushels did he get the seventh year than the sixth? How many more the eighth than the seventh? How many more the ninth than the sixth?

9. Henry's father bought a horse for $175, a carriage for $185, and a set of harness for $65. How much did all of them cost?

10. Columbus discovered America in the year 1492. How many years ago was that?

1. *Give the products quickly:*

7	4	5	9	9	6	5	9	3
3	9	8	5	3	4	6	2	8

5	8	4	2	7	5	4	3	4
7	2	8	7	4	5	4	3	5

2. *Give the products without a pencil:*

64	83	96	84	93	82	91
2	3	2	2	3	4	5

72	82	51	71	81	63	94
5	4	4	5	5	3	2

106	107	208	109	208	207	109
5	3	3	4	4	3	5

3. At the rate of 105 miles a day, how far can you travel in 3 days? In 4 days? In 5 days?

4. A city fire department has 4 horses that cost $260 each. How much did the four cost?

5. If a train averages 854 miles a day for 4 days, how far does it travel in the four days?

6. If a 5-acre field of potatoes averages 185 bushels per acre, how many bushels does the whole field yield?

7. A man bought 4 city lots for $645 each. How much did the four lots cost him?

8. If you have attended school 196 days each year for 3 years, how many days is that in all?

1. *Give the quotients quickly :*

2)8   3)9   3)27   2)16   5)40   4)12   2)14   3)15

3)24   2)18   4)16   4)20   2)12   5)25   5)15

2)10   3)21   4)28   3)18   4)8   4)32   5)35

2. *Divide by 3, giving quotients and remainders :*

5	9	4	6	8	10	7	19	15
25	14	30	24	21	29	12	27	13
22	20	18	11	28	17	26	16	23

3. Make a chart like the one above containing all the numbers from 5 to 40 and divide each by 4.

4. Make a chart containing all the numbers from 6 to 50 and divide each by 5.

See how many you can divide in 5 minutes :

5. $496 \div 4.$		**12.** $1348 \div 4.$		**19.** $2372 \div 4.$
6. $580 \div 5.$		**13.** $1730 \div 5.$		**20.** $2635 \div 5.$
7. $648 \div 4.$		**14.** $1985 \div 5.$		**21.** $2163 \div 3.$
8. $585 \div 3.$		**15.** $1356 \div 4.$		**22.** $2412 \div 3.$
9. $972 \div 2.$		**16.** $1732 \div 4.$		**23.** $2696 \div 4.$
10. $872 \div 4.$		**17.** $1962 \div 3.$		**24.** $2780 \div 5.$
11. $730 \div 5.$		**18.** $1719 \div 3.$		**25.** $2675 \div 5.$

1. A gardener bought 576 tomato plants which he wished to set out in 4 equal rows. How many must be set in each row?

2. A farmer raised 175 lambs. He sold $\frac{1}{5}$ of them at one time. How many did he sell?

3. A man dug 184 bushels of potatoes, and $\frac{1}{4}$ of them rotted. How many bushels did he lose?

4. Some children gave a circus and charged 5 pins for admission. If they took in 125 pins at the door, how many people attended?

5. If Margaret's mother canned 132 quart jars of fruit, and $\frac{1}{4}$ of them were peaches, how many jars of peaches were there?

6. Some ladies baked pies for a picnic. If there were to be 135 people at the picnic, and they allowed a pie to each 5 people, how many pies must they bake?

7. If they ordered enough milk to allow a quart for 3 persons, how many quarts must they order?

8. Martha gathered 148 blossoms from her garden. If she arranged them in 4 equal bouquets, how many blossoms in each bouquet?

9. James caught 117 perch on one fishing trip, and gave $\frac{1}{3}$ of them to his friends. How many did he give away?

10. A barrel of flour contains 196 pounds. If a family uses 2 pounds of flour a day, how long will a barrel of it last?

1. *Add :*

6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9

2. $6 \times 6 = ?$ $6 \times 7 = ?$ $7 \times 6 = ?$ $6 \times 8 = ?$ $8 \times 6 = ?$
$6 \times 9 = ?$ $9 \times 6 = ?$

3. $6)\overline{36}$ $6)\overline{42}$ $6)\overline{48}$ $9)\overline{54}$ $7)\overline{42}$ $8)\overline{48}$ $6)\overline{54}$

4. You have studied 6 times every number from 6×2 to 6×5.   You now have above —— new products with 6. Give them quickly.

5. Give all the products from 6×1 to 6×9.

6. Count by sixes from 6 to 54.   Say 6, 12, 18, and so on to 54.   Count back by sixes from 54 to 6.

7. *Give the products quickly :*

6	3	6	5	6	6	9
6	6	7	6	8	4	6

Table of 6's

$6 \times 1 = 6$	$6 \times 6 = 36$	$6 \div 6 = 1$	$36 \div 6 = 6$
$6 \times 2 = 12$	$6 \times 7 = 42$	$12 \div 6 = 2$	$42 \div 6 = 7$
$6 \times 3 = 18$	$6 \times 8 = 48$	$18 \div 6 = 3$	$48 \div 6 = 8$
$6 \times 4 = 24$	$6 \times 9 = 54$	$24 \div 6 = 4$	$54 \div 6 = 9$
$6 \times 5 = 30$	$6 \times 10 = 60$	$30 \div 6 = 5$	$60 \div 6 = 10$

Add:

1.	2.	3.	4.	5.
378	964	192	787	594
378	964	192	787	594
378	964	192	787	594
378	964	192	787	594
378	964	192	787	594
378	964	192	787	594

6. Find the answer to each of the first five exercises in another way. Which way do you prefer? Why?

Find the products :

7.	8.	9.	10.	11.
467	914	548	666	389
6	6	6	6	6

Find the quotients and remainders :

12. $15 \div 6$ $39 \div 6$ $51 \div 6$ $45 \div 6$ $27 \div 6$

Find the quotients :

13.	14.	15.	16.	17.
6)258	6)432	6)744	6)882	6)714

18. There are 6 work days in each week, and 52 weeks in a year. How many work days in a year?

19. If you gather 6 eggs a day, how long will it take you to gather 144, or twelve dozen?

20. If a quart of ice cream is enough to serve 6 persons, how many quarts must be ordered for a party of 96?

1. A farmer had a 6-acre field of potatoes. How many bushels in his whole crop if he got 236 bushels per acre?

2. If a boy earns 65 cents a day for 5 days, what does he earn in all?

3. How many quarts in 264 gallons?

4. 173 gallons of syrup will fill how many quart bottles?

5. A boy delivers 72 papers a day. How many does he deliver in 6 days?

Find the products:

6.	7.	8.	9.	10.
268	793	865	931	827
6	5	6	4	5

11. 4×368. 14. 6×841. 17. 5×899.

12. 6×928. 15. 5×167. 18. 6×798.

13. 5×793. 16. 4×268. 19. 4×643.

Find the quotients:

20.	21.	22.	23.	24.
4)168	5)155	6)186	3)969	4)208

25. $189 \div 3$.   28. $246 \div 6$.   31. $405 \div 5$.

26. $355 \div 5$.   29. $248 \div 4$.   32. $450 \div 5$.

27. $366 \div 6$.   30. $324 \div 4$.   33. $426 \div 6$.

34. 4×236.   37. $726 \div 3$.   40. 5×783.

35. 5×240.   38. $840 \div 4$.   41. 6×829.

36. 6×150.   39. $792 \div 6$.   42. 4×967.

1. $2 \times 7 = 7 \times 2$, $3 \times 7 = 7 \times 3$, and so on. You know the table of 7's to 7×6. Write it.

2. Show by drawing a rectangle 7 inches wide and 10 inches long, and dividing it into square inches, that

$$7 \times 7 = 49 \qquad 7 \times 8 = 56 \qquad 7 \times 9 = 63 \qquad 7 \times 10 = 70$$

3. *Give quickly:*

$$7 \overline{)49} \qquad 7 \overline{)63} \qquad 7 \overline{)56} \qquad 7 \overline{)70}$$

Find the products:

4.	5.	6.	7.	8.	9.
345	246	841	923	726	847
7	7	7	7	7	7

10.	11.	12.	13.	14.	15.
936	819	738	645	836	748
7	7	7	7	7	7

Find the quotients:

16.	17.	18.	19.	20.	21.
$7\overline{)168}$	$7\overline{)294}$	$7\overline{)364}$	$7\overline{)245}$	$7\overline{)581}$	$7\overline{)644}$

Table of 7's

$7 \times 1 = 7$	$7 \times 6 = 42$	$7 \div 7 = 1$	$42 \div 7 = 6$
$7 \times 2 = 14$	$7 \times 7 = 49$	$14 \div 7 = 2$	$49 \div 7 = 7$
$7 \times 3 = 21$	$7 \times 8 = 56$	$21 \div 7 = 3$	$56 \div 7 = 8$
$7 \times 4 = 28$	$7 \times 9 = 63$	$28 \div 7 = 4$	$63 \div 7 = 9$
$7 \times 5 = 35$	$7 \times 10 = 70$	$35 \div 7 = 5$	$70 \div 7 = 10$

1. *Give the following in half a minute:*

7×3	5×7	7×4	7×8	9×7
7×7	8×7	7×2	6×7	7×5
7×9	7×6	4×7	$21 \div 7$	$42 \div 7$
$63 \div 7$	$49 \div 7$	$28 \div 7$	$35 \div 7$	$56 \div 7$

2. *Give quotients and remainders:*

$18 \div 7$ $40 \div 7$ $32 \div 7$ $54 \div 7$ $27 \div 7$ $48 \div 7$

See how many you can copy and multiply in two minutes:

3.	**4.**	**5.**	**6.**	**7.**
423	592	916	384	675
7	7	7	7	7

See how many you can copy and divide in two minutes:

8.	**9.**	**10.**	**11.**	**12.**
7)322	7)574	7)896	7)833	7)672

13. If you set 36 cabbage plants in a row, how many plants will it take for 7 rows?

14. If Harry gathers an average of 58 pounds of tomatoes a day from his vines, how many pounds will he gather in 7 days?

15. A restaurant uses 7 bushels of potatoes a day. How many bushels would it use in a year of 365 days?

16. If the restaurant uses 686 quarts of milk in a week of 7 days, how many quarts does it use in a day?

1. Name the days in a week. How many days in 4 weeks?

2. The month of December has how many days more than 4 weeks?

DECEMBER, 1914						
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

3. February is the shortest month of the year. It has just 4 weeks. How many days in February?

4. June has 30 days, or —— days more than 4 weeks.

5. There are 52 weeks and 1 day more in a year. How many days in a year?

---

7 days make 1 week
52 weeks make nearly 1 year

---

6. How many weeks in 35 days? In 42 days? In 56 days? In 49 days?

7. It is 8 weeks till Christmas; how many days is this?

8. How much more than 4 weeks in each month?

January, 31 days	July, 31 days
February, 28 days	August, 31 days
March, 31 days	September, 30 days
April, 30 days	October, 31 days
May, 31 days	November, 30 days
June, 30 days	December, 31 days

See how many you can copy and multiply in five minutes :

1.	2.	3.	4.	5.
476	269	683	582	818
6	7	7	6	7

6.	7.	8.	9.	10.
549	825	194	617	888
6	7	6	7	6

Give quotients and remainders :

11.   7)38   7)24   6)50   6)47   7)52   6)27

See how many you can copy and divide in five minutes:

12.	13.	14.	15.	16.
6)888	6)558	7)896	7)609	6)948

17.	18.	19.	20.	21.
7)693	6)462	7)889	7)672	6)972

22. How many weeks in 182 days?

23. It has been 133 days since the Fourth of July. How many weeks has it been?

24. A gardener tied 336 radishes for the market in bunches of 6 each. How many bunches did they make?

25. If candy is put on a Christmas tree for 189 children, and each child is to get 6 sticks, how many sticks will it take in all?

26. If 7 sticks of candy weigh a pound, how many pounds will it take for the tree?

1. You should now know all the tables except *five new facts*. You know the 8's to 8×7. Give them.

2. You know the 9's to 9×7. Give them.

3. The new facts are:

$8 \times 8 = 64 \quad 8 \times 9 = 72 \quad 8 \times 10 = 80 \quad 9 \times 9 = 81 \quad 9 \times 10 = 90$

4. $\frac{1}{5}$ of $40 =$ ———. $\frac{1}{6}$ of $48 =$ ———. $\frac{1}{8}$ of $48 =$ ———.

5. $\frac{1}{7}$ of $56 =$ ———. $\frac{1}{8}$ of $56 =$ ———. $56 \div 8 =$ ———.

6. Eight rows of desks with 8 in a row are ——— desks.

7. To get 64 I must add ——— 8's. $8 \times 8 =$ ———.

8. $64 - 56 =$ ———. $56 + $ ——— $= 64$. $7 \times 8 =$ ———.

9. $\frac{1}{8}$ of $56 =$ ———. $\frac{1}{8}$ of $64 =$ ———. $\frac{1}{8}$ of $48 =$ ———.

10. $9 \times 8 =$ ———. $\frac{1}{8}$ of $72 =$ ———. $\frac{1}{9}$ of $72 =$ ———.

Table of 8's and 9's

$8 \times 1 = 8$	$8 \div 8 = 1$	$9 \times 1 = 9$	$9 \div 9 = 1$
$8 \times 2 = 16$	$16 \div 8 = 2$	$9 \times 2 = 18$	$18 \div 9 = 2$
$8 \times 3 = 24$	$24 \div 8 = 3$	$9 \times 3 = 27$	$27 \div 9 = 3$
$8 \times 4 = 32$	$32 \div 8 = 4$	$9 \times 4 = 36$	$36 \div 9 = 4$
$8 \times 5 = 40$	$40 \div 8 = 5$	$9 \times 5 = 45$	$45 \div 9 = 5$
$8 \times 6 = 48$	$48 \div 8 = 6$	$9 \times 6 = 54$	$54 \div 9 = 6$
$8 \times 7 = 56$	$56 \div 8 = 7$	$9 \times 7 = 63$	$63 \div 9 = 7$
$8 \times 8 = 64$	$64 \div 8 = 8$	$9 \times 8 = 72$	$72 \div 9 = 8$
$8 \times 9 = 72$	$72 \div 8 = 9$	$9 \times 9 = 81$	$81 \div 9 = 9$
$8 \times 10 = 80$	$80 \div 8 = 10$	$9 \times 10 = 90$	$90 \div 9 = 10$

NOTE. — Show the pupils that in the 9's the sum of the two digits of the product is 9, and that the tens' digit is one less than the number multiplied.

1. Multiply the following numbers first by 8 and then by 9: 2, 4, 6, 8, 3, 5, 7, 9.

2. Divide these numbers by 8 : 16, 32, 48, 64, 40, 24, 56, 72.

3. Find $\frac{1}{9}$ of these numbers : 18, 36, 72, 27, 54, 81, 63, 45.

4. Take $\frac{1}{9}$ of 72 from $\frac{1}{8}$ of 72.

5. Which is larger, $\frac{1}{8}$ of 56 or $\frac{1}{9}$ of 63 ?

6. The boys of the Scammon School formed 6 baseball nines.   How many boys did it take ?

7. If there are 81 boys in the third grade, how many baseball nines can they form ?

8. If a quart of milk costs 9 cents, how much will 7 quarts cost ?

9. If you spend 8 cents for your lunch each school day for a week, how much do you spend in all ?

10. At 8 cents each, how much must your mother pay for 6 grape fruit ?

11. At 9 cents a quart, how much will 7 quarts of berries cost ?

12. At 8 cents each, how many grape fruit can your mother buy for 56 cents ?

13. At 8 cents a quart, how many quarts of beans can she buy for 24 cents ?

14. At 9 cents a quart, how much will 5 quarts of berries cost ?

1. At 8 cents a quart, what is the cost of 6 quarts of milk?

2. If you learned to spell 9 new words a day, how many would you learn in 5 days or a week of school?

3. If you were given 27 words in a spelling lesson, and missed $\frac{1}{9}$ of them, how many would you miss?

4. A boys' baseball nine paid 72 cents for a bat and a ball. How much did it cost each boy?

5. They went on a trip that cost the team 81 cents. What was each boy's share of the expense?

Problems

6. A farmer raised 708 bushels of potatoes on 6 acres. How many bushels on one acre was that?

7. A laundry charged 8 cents apiece for laundering boys' shirts. If it laundered 49 shirts one week, what was the total cost?

8. If a store sold 36 girls' dresses at $7 apiece, how much did they come to?

9. John fed his pigeons 8 pounds of grain a day for 49 days to fatten them. How much grain did it take all together?

10. Last year he raised 28 pigeons and this year he raised 9 times as many as last year. How many did he raise this year?

11. If $\frac{1}{7}$ of John's pigeons were to fly away this year and not return, how many would he lose?

1. Give aloud the multiplication tables of 6's, 7's, 8's, and 9's.

2. See how long it takes you to write these four tables.

3. See how long it takes you to multiply 897 by 6. By 7. By 8. By 9. Which table must you study most?

4. *Give quickly the products :*

5	7	9	8	4	7	6	9	3	7
8	4	3	6	9	8	9	5	8	6

5. As the teacher pronounces numbers like those in Exercise 4, write their products.

6. *Give quickly the quotients :*

7)56   6)42   9)72   8)48   6)54   9)81   7)63

7. As the teacher pronounces numbers like those in Exercise 6, write their quotients.

8. Let the class divide into two teams, and let the teacher pronounce problems like those in Exercises 4 and 6, as in a spelling contest. Those missing the answers sit down. See which team wins.

Find the products :

9.	10.	11.	12.	13.	14.
475	863	967	594	726	999
6	9	5	8	7	4

Give the quotients :

15.	16.	17.	18.	19.	20.
5)335	8)232	7)581	9)378	6)588	8)456

NOTE. — These tables prepare for written work, and should be used repeatedly.

TABLE I

Divide the following numbers by 8, giving quotients and remainders, first by columns and then by lines :

	A	B	C	D	E	F	G	H	I	J
1.	8	40	56	32	72	16	48	64	80	24
2.	9	43	58	35	73	18	52	65	84	28
3.	12	41	61	37	77	21	49	69	87	29
4.	14	46	60	33	75	17	53	66	83	25
5.	10	42	59	38	79	22	50	70	86	30
6.	13	45	63	34	76	19	54	67	82	26
7.	11	47	62	39	74	23	51	71	85	31
8.	15	44	57	36	78	20	55	68	81	27

TABLE II

Divide these numbers by 9, first by columns and then by lines, giving quotients and remainders :

	A	B	C	D	E	F	G	H	I	J
1.	9	90	18	54	81	63	45	36	72	27
2.	10	95	22	58	82	68	46	37	77	36
3.	14	91	25	59	87	64	51	40	81	31
4.	11	96	19	55	83	69	47	44	76	35
5.	15	92	23	60	88	65	52	38	80	30
6.	12	97	26	63	84	70	48	41	75	34
7.	16	93	20	56	89	53	42	79	29	66
8.	13	98	24	61	85	71	49	39	74	33
9.	17	94	27	62	90	67	54	43	78	28
10.	18	99	21	57	86	50	45	73	32	72

1. Nellie gathered 125 daisies and Mary gathered 68. How many more did Nellie gather than Mary?

2. A man bought a carriage for $318 and sold it for $575. How much did he gain?

3. A woman went shopping with $115 and spent all but $68. How much did she spend?

4. If a boy earns $3 a week, how long will it take him to earn $240?

5. A man earned $820 and spent $165 of it. How much had he left?

6. After spending $45 I had $217 left. How much had I at first?

7. Mabel gathered 285 violets and gave $\frac{1}{3}$ of them to a sick girl. How many did she give her?

8. Two children gathered 230 chestnuts. If one of them gathered 118 of them, how many did the other gather?

9. Ross had 167 marbles, William had 85, and Charles had 75. How many had they all?

10. Alice had 168 violets. She gave away 90 to some girls. How many had she left?

11. A farmer sold his apples for $4 a barrel. He received $132 for them. How many barrels did he sell?

12. A boy sold 342 apples at the rate of 3 apples for 1 cent. How much did he receive for them?

13. A boy sold 608 papers in January and 473 in February. How many more did he sell in January than in February?

Find the product of :

1. 385 9	**2.** 296 9	**3.** 714 9	**4.** 583 8	**5.** 692 8
6. 471 8	**7.** 563 9	**8.** 365 8	**9.** 726 9	**10.** 672 8

11. 8×546. **16.** 9×719. **21.** 9×342.

12. 9×645. **17.** 8×288. **22.** 9×991.

13. 8×782. **18.** 9×828. **23.** 8×688.

14. 9×827. **19.** 8×773. **24.** 8×899.

15. 9×971. **20.** 9×737. **25.** 9×789.

26. A farmer had 9 acres of potatoes that yielded 185 bushels per acre. Find the total yield.

27. If a man sells 9 city lots at $485 a lot, how much does he get for them?

28. A gardener set 8 rows of cabbage plants. If there were 165 plants in each row, how many in all?

29. A drayman has 9 barrels of flour on his wagon. At 196 pounds to the barrel, how heavy is his load?

30. If your school uses 9 boxes of lead pencils, each containing 144 pencils, how many does it use?

31. If a man is able to save $325 a year, how much can he save in 8 years?

32. In a certain school there were 856 pupils. They were each given pads of writing paper 8 times during the year. How many pads were given out?

Find the quotient of:

1.	2.	3.	4.	5.
9)1296	9)1134	9)2142	9)1764	9)1341

6.	7.	8.	9.	10.
8)3464	8)2712	8)1984	8)2176	8)2816

11. $774 \div 9$.	16. $456 \div 8$.	21. $1269 \div 9$.
12. $584 \div 8$.	17. $738 \div 9$.	22. $2016 \div 8$.
13. $736 \div 8$.	18. $392 \div 8$.	23. $1344 \div 8$.
14. $432 \div 9$.	19. $648 \div 9$.	24. $2124 \div 9$.
15. $315 \div 9$.	20. $696 \div 8$.	25. $2120 \div 8$.

26. A farmer took 9 bales of hay to market. The hay weighed 1260 pounds. What was the average weight of each bale?

27. A farmer got 416 bushels of oats from an 8-acre field. What was the average per acre?

28. An ocean liner traveled 3088 miles in 8 days. What was the average rate per day?

29. Mr. James sold 9 fat hogs for $198. What was the average price of each?

30. On a small field a farmer raised 9 bales of cotton weighing 4464 pounds. What was the average weight of each bale?

31. The 9 rooms of a school average 43 pupils each. How many pupils in the school?

1. A building lot cost $725 and a house 8 times as much. What did the house cost?

2. Mary has 684 aster plants. If she puts an equal number in each of 6 rows, how many plants in each row?

3. A bushel of corn weighs 56 pounds. How many pounds in 4 bushels? In 6 bushels? In 7 bushels?

4. A man divides a farm of 524 acres into 4 equal fields. How many acres in each field?

5. A farmer got 225 bushels of grain from 9 acres. How many bushels did the field average per acre?

6. A man divides $875 among 7 children. How much does he give each?

7. If one small engine uses 326 pounds of coal in 1 day, how much will it use at this rate in 8 days?

8. A boy has 9 rows of potatoes. If each row yields 16 bushels, how many bushels will he have?

9. A gardener raised 328 bushels of onions and has sold $\frac{1}{4}$ of them. How many bushels did he sell?

10. A man bought 6 building lots at $324 each. How much did they all cost him?

11. At a salary of $165 a month, how much will a man earn in 7 months? In 9 months?

12. 396	13. 347	14. 984	15. 397	16. 279
×7	×8	×7	×9	×6

17. 7)378 18. 6)144 19. 8)256 20. 9)342 21. 7)392

1. There are three schools in a town and each school has 268 pupils. Show two ways of finding how many pupils in all.

2. A man has 345 trees in each of 4 orchards. Use two ways of finding how many trees he has in all.

3. A party of 4 went nutting. On counting they found that they had 540 nuts each. How many in all? Find it in two ways.

4. A dealer sold 5 ponies at $135 each. How much did he get for all? Find it in two ways.

5. A man sold 4 building lots for $638 each. How much did he get for all?

6. A square lot is 342 feet long. How far around it?

7. If there are 386 apples in a barrel, how many apples in 5 barrels each containing as many?

8. A gardener raised 324 bushels of onions on one acre. At this rate, how many bushels could he have raised on 4 acres?

9. If a gardener raised 1224 bushels of potatoes on 9 acres, what was the average yield per acre?

10. If a man's salary is $185 a month, how much will he receive for 5 months?

11. If a man pays $325 a year for house rent, how much will he pay in 4 years?

12. It is 283 miles from Detroit to Chicago. How many miles must one travel in going to Chicago from Detroit and returning? Find in two ways.

The money we use in the United States is expressed in **dollars** and **cents**. A period, called the **decimal point**, is placed between dollars and cents. Cents are written in two places at the right of the decimal point. Thus 8 dollars and 25 cents is written $8.25.

1. *Read:* $7.35; $11.15; $10.90; $16.10; $3.05; $9.06.

To add or subtract United States money, the decimal points should be written under each other. This causes the dollars to come under dollars and cents under cents.

2. *Read and add:*

$5.25	$7.12	$6.24	$7.09	$3.20
6.17	8.09	3.19	3.40	2.48
4.63	5.16	4.08	6.10	6.13

Write in columns and add:

3. $4.16 + $5.80 + $3.95.

4. $9.05 + $6.48 + $7.16.

5. $7.13 + $4.16 + $3.85.

6. $6.48 + $8.13 + $5.09.

7. $8.45 + $6.38 + $1.45.

8. $9.05 + $0.48 + $6.03.

9. $8.75 + $3.65 + $7.08.

10. $3.48 + $2.65 + $8.98.

Write in columns and subtract:

11. $9.65 − $3.48.

12. $7.06 − $3.21.

13. $8.31 − $6.18.

14. $9.10 − $8.05.

15. $7.10 − $3.40.

16. $8.07 − $2.65.

17. $6.48 − $1.96.

18. $5.03 − $1.81.

Read and add :

1.	2.	3.	4.
$48.65	$65.50	$97.08	$87.54
54.08	38.98	63.75	73.96
68.19	59.37	86.90	25.08

5. From $5 take $2.38.

WORK

$5.00
2.38
———
$2.62

EXPLANATION. — Since there are $5 and no cents, we write $5 in the form $5.00 to show that there are no cents. Since there is nothing from which to take the 8, we change $1 to 10 of the first place to the right of the decimal point. Then of this 10 we change 1 to 10 of the next place to the right. Then 8 from 10 are 2, 3 from 9 are 6, 2 from 4 are 2.

NOTE. —The Austrian or "making change" method of subtracting is considered easier by some. Use one but not both methods. Place the emphasis upon " how," not " why."

6. *Read and subtract :*

$6.10	$8.30	$9.04	$8.07	$9.30
2.06	5.14	7.32	2.65	6.48

7. James had $12.36 in his bank, but bought a coaster with $6.75 of it. How much had he left?

8. Mary had $4.58 and her aunt gave her $2.50 for a birthday present. How much had she then?

9. Henry wants to buy a bicycle that costs $21.50. He has $12.38. How much more does he need?

10. Mary's large doll cost $5.25 and its dress and shoes cost $1.35. How much did all cost?

1. John had $26.80 in a savings bank and put in $3.85 more at one time and $1.95 at another. How much had he in the bank then?

2. Frank had $8.30, but spent $3.85 for Christmas presents for his mother and sister. How much had he left?

3. James had $4.65 and his father and mother each gave him $2.50 for a birthday present. How much had he then? If he spends $6.25 for a coaster, how much has he left?

4. Sydney had $68.40 in the savings bank at the beginning of the year. He put in $27.85 during the year and also received $2.28 in interest. How much had he in the bank at the end of the year? (The interest which the bank allowed him was left in the bank and added to what he already had there.)

NOTE TO TEACHER. — Explain to the pupils that savings banks pay interest upon money deposited and what interest means.

5. If you have $65.26 in the bank at the beginning of the year and put in $8.40 at one time, $2.45 at another, and $4.00 at another, and the interest for the year is $1.76, how much will you have at the end of the year?

6. A boy now in high school began putting money in the savings bank when he was in the third grade of school. He now has $238.48 in the bank. If he puts in $45 more during the coming year and gets $7.52 interest, how much will he then have?

The coins commonly used in business are of the value of 1¢, 5¢, 10¢, 25¢, 50¢, and $1.

Besides coins, banknotes are also used; they are worth $1, $2, $5, $10, $20, and sometimes more.

1. John buys 17 cents' worth of paper, and gives the dealer a 25-cent piece. He will receive in change —— cents.

The dealer may count the change as he gives it to John. Beginning with the cost of the paper, he will say, — 17 and 3 are 20, and 5 are 25, or simply 17, 20, 25, — as he gives him 3 cents and a nickel.

2. Clara buys 38 cents' worth of thread and needles, and gives the clerk a half-dollar. She will receive —— cents in change.

The clerk says, — 38 and 2 are 40, and 10 are 50, or 38, 40, 50, — as he gives her 2 cents and a dime.

3. Make change out of a quarter for a 13-cent sale.

4. Count change out of a dollar for a 68-cent sale.

5. If you were a clerk, how would you count change for 51 cents if the buyer gave you $1?

6. Mr. Ward sells 7 qt. of milk at 8 cents and receives 3 silver quarters. Count the change for him.

Make change for:

7. $1.25 out of $5.
8. 73¢ out of $2.
9. 29¢ out of $1.
10. $3 out of $10.
11. $1.56 out of $2.
12. 6 yd. at 11¢ out of $1.
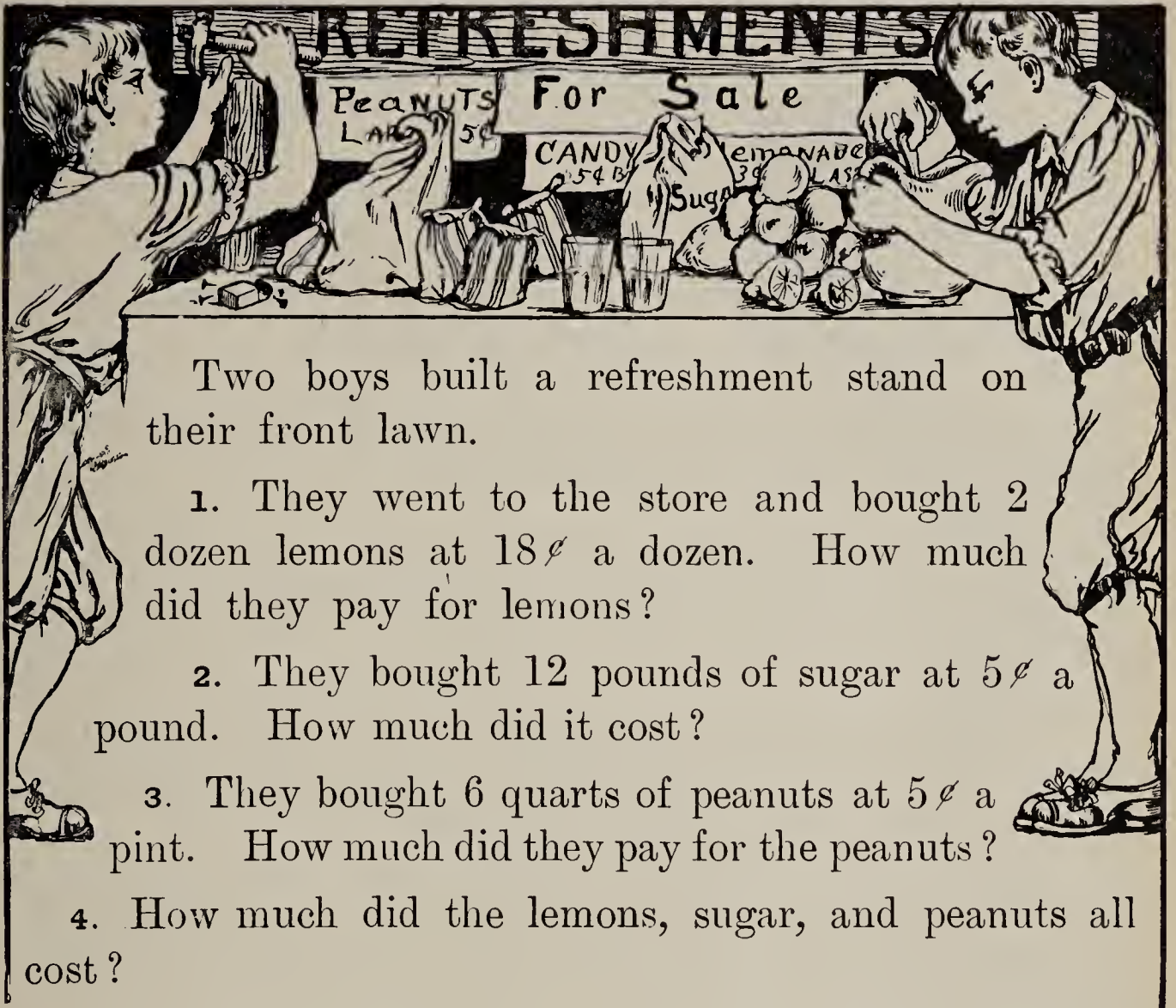
Two boys built a refreshment stand on their front lawn.

1. They went to the store and bought 2 dozen lemons at 18¢ a dozen. How much did they pay for lemons?

2. They bought 12 pounds of sugar at 5¢ a pound. How much did it cost?

3. They bought 6 quarts of peanuts at 5¢ a pint. How much did they pay for the peanuts?

4. How much did the lemons, sugar, and peanuts all cost?

5. In paying for this they gave the clerk a $2 bill. How many cents was that? How much change did the clerk give them?

6. They used part of the sugar for candy and part for lemonade. They sold 15 bags of candy at 5¢ a bag. How much did they get for candy?

7. Their mother made them some pop-corn balls. They sold 16 of them for 5¢ each. How much did they get for them?

1. Name the six coins in common use.

2. How much money would you have if you had one of each of these coins?

3. What is the entire value of the four silver coins?

4. Who makes the money we use? What is counterfeit money?

5. If you were asked to change a $20 bill, what seven smaller bills might you give instead?

6. If you were a clerk in a drug store, how would you count back the change from a two-dollar bill for a purchase of 42 cents?

7. Which are more convenient, silver dollars or dollar bills? Why? If 17 silver dollars weigh a pound, what will 5 pounds of silver dollars be worth?

8. If you carry to the bank 7 $5 bills, 1 $10 bill, and 10 half-dollars, what large bill could the cashier give you in exchange?

9. There are 30 dimes and 50 nickels in the contribution box. What is the value of the collection?

Count back the change from a five-dollar bill for these purchases :

10.	$1.87	13.	$3.37	16.	$4.16
11.	$2.52	14.	$1.19	17.	$1.48
12.	$0.76	15.	$2.64	18.	$3.33

"PLAYING CASHIER"

These children are playing cashier. The boy at the cashier's desk is playing that he is the cashier of a large gas company. The other children are playing that they are paying their monthly gas bills. They have toy money.

1. Martha owed the gas company a bill of $1.45. She handed the cashier a two-dollar bill. How much change should he give her?

2. Roger owed $1.13. How much change should he get back from a two-dollar bill?

3. Tom owed the gas company $2.37. He gave the cashier a five-dollar bill. How much change should he get back?

4. Lucy paid a bill of $3.16 with a five-dollar bill. How much change was due her?

5. If Samuel owed $2.89 and gave the cashier 2 two-dollar bills, how much change should he get back?

6. If your gas bill for the month is $1.68, what coins could you use in paying it?

7. Suppose you were cashier in a grocery store and a customer gave you a ten-dollar bill to pay a bill of $3.67. How much would you return?

NOTE. — Children like to play this game. Toy money can be made by writing the denominations on bits of cardboard or on paper. Making change is an important process and should receive much attention. Ways to vary the game will occur to the teacher.
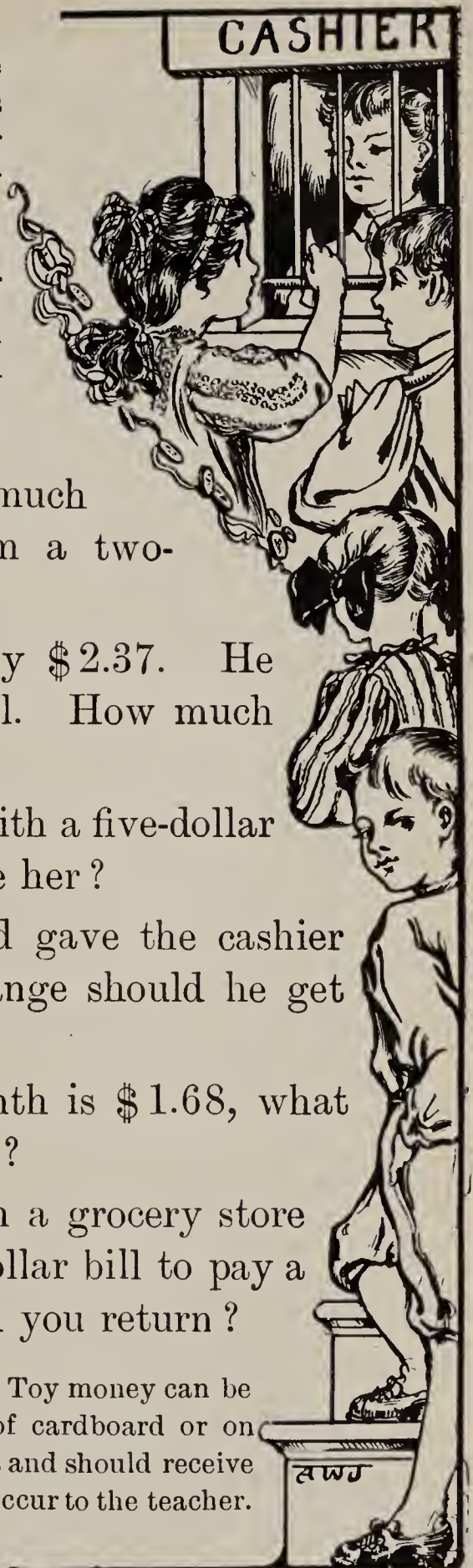
1. A farmer sold 5 sheep at $7.35 each. How much did he get for all?

WORK   *Remember* that when there are cents in the mul-

$7.35   tiplicand, the last two right-hand figures in the

   5   product represent cents, and must be separated from

$36.75   the dollars by a decimal point.

Find the products :

2.	3.	4.	5.	6.
$3.67	$8.39	$7.66	$8.27	$9.35
4	5	3	4	2

7.	8.	9.	10.	11.
$6.35	$8.03	$9.37	$8.63	$7.28
4	4	4	5	5

12.	13.	14.	15.	16.
$8 27	$9.16	$8.48	$7.45	$8.27
3	3	4	5	4

17. $3 \times \$19.30.$ 19. $4 \times \$38.40.$ 21. $5 \times \$36.80.$

18. $3 \times \$27.84.$ 20. $4 \times \$49.56.$ 22. $5 \times \$85.42.$

23. Harry bought 4 books at $1.38 each to give as Christmas presents. How much did they all cost?

24. Mr. Brown bought skates for each of his 3 children. The skates cost $2.75 a pair. How much did the three pairs cost?

1. When I divide $7.50 among 4 boys, each one will receive $\frac{1}{4}$ of $7.50, or ———.

Divisor = 4)$7.50 = Dividend.
        $1.87 = Quotient.
        $0.02 = Remainder.

Proof: 4 × $1.87 + $0.02 = $7.50.

Remember that the right-hand figures are cents when the dividend contains cents. Separate them from the dollars by a period.

Find the quotients :

2.	3.	4.	5.
4)$12.80	5)$19.20	4)$28.98	5)$45.20

6.	7.	8.	9.
3)$16.20	3)$14.78	5)$26.70	5)$18.40

Find the quotients :

10. $64.05 ÷ 3.
11. $78.96 ÷ 3.
12. $36.54 ÷ 3.
13. $49.68 ÷ 4.
14. $76.64 ÷ 4.
15. $93.28 ÷ 4.
16. $67.48 ÷ 4.
17. $46.30 ÷ 5.
18. $59.35 ÷ 5.
19. $88.15 ÷ 5.
20. $96.10 ÷ 5.

21. $157.63 ÷ 3.
22. $191.23 ÷ 3.
23. $179.32 ÷ 4.
24. $115.32 ÷ 3.
25. $257.48 ÷ 4.
26. $136.10 ÷ 5.
27. $237.24 ÷ 4.
28. $197.10 ÷ 3.
29. $208.41 ÷ 3.
30. $178.16 ÷ 4.
31. $196.05 ÷ 5.

Find the product of:

1.	2.	3.	4.	5.
$8.54	$9.76	$8.32	$9.16	$5.84
6	6	6	7	7

6.	7.	8.	9.	10.
$7.63	$1.96	$2.78	$5.46	$8.73
7	8	8	8	9

11.	12.	13.	14.	15.
$3.68	$5.34	$6.13	$7.28	$6.89
9	8	9	8	7

16. If a man earns $4.75 a day, how much can he earn in a week of 6 working days?

17. If wood is $5.35 a cord, how much will 8 cords cost?

18. If coal is $6.25 a ton, how much will 9 tons cost?

19. In building a house, a man used 9 doors costing $8.75 each. Find the cost of all.

20. A gardener sold 8 bushels of early peas at $2.15 a bushel. How much did he get for them?

21. James gets an allowance of $2.75 a month. How much does he get in 8 months?

22. Charles bought 6 fine hens for $1.25 apiece. How much did all of them cost him?

23. Mr. Jones sold 8 turkeys at Thanksgiving for $1.95 apiece. How much did he get for all of them?

24. At $1.65 apiece, how much must I pay for 9 china plates?

Find the quotients of:

1.	2.	3.	4.
9)$58.14	8)$67.44	8)$93.92	9)$78.21

5.	6.	7.	8.
7)$67.55	7)$53.83	9)$84.15	8)$91.60

9. John's father sold 6 hogs for $83.10. What was the average price of each?

10. Ralph sold 7 young hens for $11.55. What was the average price of each?

11. Mr. Thompson had a 6-acre garden from which he sold $828 worth of truck. What was the average per acre?

12. A gardener got $2.08 for 8 quarts of early raspberries. How much was that a quart?

13. Mr. Adams got $28.35 for 9 barrels of apples. How much was that a barrel?

14. A gardener got $9.20 for 8 bushels of onions. How much was that a bushel?

15. Six boys went camping for a week. Their entire expenses were $11.64. How much was that for each boy?

16. John went on a 5-weeks summer trip that cost him $28.45. How much was that a week?

17. Four boys kept a refreshment stand, and made $14.56. How much should each boy get?

18. Robert bought a gun that cost $4.75. He paid for it in 5 equal payments. How much was each payment?

1. This is Christmas morning. Sydney and Lucile are playing with their toys. The doll cost $ 5.25. How much less than $ 10 is this?

2. Lucile got a little Morris-chair that cost $ 6.75. What did the doll and chair both cost?

3. Sydney got a "Humpty-dumpty" circus and menagerie. The 4 animals cost 75 ¢ each. What did the 4 cost?

4. The 4 actors and clowns each cost 85 ¢. What did the 4 cost?

5. The complete show cost $ 8.75. How much did all except the animals and people cost?

6. Sydney's toys in all were: the show, $ 8.75; a sled, $ 1.35; a pair of skates, $ .85; a tool chest, $ 3.25. Find the cost of all.

7. Lucile's presents were as follows: a chair, $ 6.75; a doll, $ 5.25; "A Child's Garden of Verses," $ 1.75; "Poems of Childhood," $ 1.75. Find the cost of all.

8. Whose presents cost more, and how much?

Market Report

Baldwin apples, $3.50 a barrel	Oranges, $4.85 a box
Spy apples, $2.90 a barrel	Grape fruit, $5.45 a box
Maine potatoes, $2.75 a bag	Cranberries, $12.85 a barrel

From the above market report find the cost of:

1. 3 bbl. of Baldwin apples.
2. 5 bbl. of Spy apples.
3. 4 boxes of grape fruit.
4. 7 bags of potatoes.
5. 3 bbl. of cranberries.
6. 6 boxes of oranges.

7. 8 boxes of oranges.
8. 9 bags of potatoes.
9. 7 boxes of grape fruit.
10. 5 boxes of oranges.
11. 3 bags of potatoes.
12. 7 bbl. of Spy apples.

13. In a school of 72 boys, if they march 4 abreast, how many rows of four each will there be? How many rows if they march 6 abreast?

14. A dealer has 6 boxes of oranges that average 216 oranges to the box. How many oranges in all?

15. Mr. Anderson bought 6 gallons of maple syrup at $1.45 a gallon. How much did it cost him?

16. If you spend $1.35 for a pair of skates, how much change should you get back from a $2 bill?

17. Frank has a "talking machine." He wishes to buy 6 records that cost 75 cents each. How much will all cost?

18. Donald wishes to buy a bicycle that costs $17.50. He now has $12.85. How much more does he need?

1. Measure the length of your desk in feet and inches.

2. Let one pupil draw a straight line on the blackboard. Let each pupil estimate the length of it. Measure to see which is most nearly correct.

3. How wide do you think the room is? Measure to see how nearly correct you are.

4. How wide do you think the door is? Measure it.

5. Draw a line on the blackboard that you think is 8 inches long. Measure it.

6. Draw a line that you think is 4 feet long. Measure it.

7. How many feet in a yard?

8. Draw a line that you think is a yard long. Measure it.

9. How many yards long do you think the room is? Measure it.

Copy and fill blanks:

10. 24 in. = —— ft.   16. 8 yd. = —— ft.
11. 36 in. = —— ft.   17. 6 ft. = —— yd.
12. 3 ft. = —— in.   18. 9 ft. = —— yd.
13. 5 ft. = —— in.   19. 6 yd. = —— ft.
14. 2 yd. = —— in.   20. 9 yd. = —— ft.
15. 4 yd. = —— in.   21. 18 ft. = —— yd.

22. If you have a garden 12 feet long and 8 feet wide, how many feet of wire netting will you need to fence it?

One inch	One inch	One inch
One square inch	One square inch	One square inch
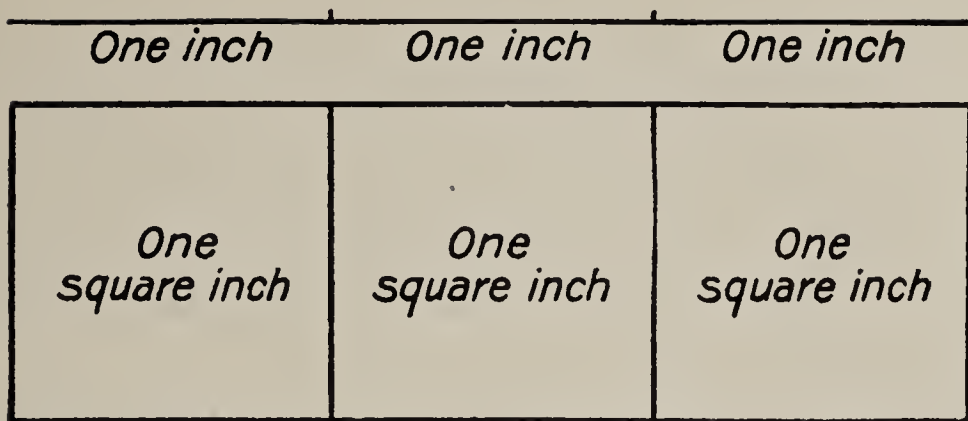
1. We may measure the *length* of anything by some other length *one inch* long, *one foot* long, or *one yard* long.

Measure the length and width of the figure at the top of the page.

2. We measure a **surface**, such as the top of your desk, the blackboard, the floor of your room, or the walls of your room, by some **square surface**, as a **square inch**, a **square foot**, or a **square yard**.

How many square inches in the figure shown above?

3. A figure with 4 sides and 4 square corners like the one at the top of the page is called by what name?

4. Draw a rectangle 2 inches wide and 3 inches long. Divide it into square inches. How many are there?

5. Cut a number of square inches from cardboard. Build a square with them, each side of which is 2 inches. How many square inches in the square?

6. Build a rectangle 2 inches wide and 4 inches long. How many square inches does it take?

7. Draw a rectangle 3 inches wide and 4 inches long. Divide it into square inches. How many are there?

1. Draw upon the blackboard a square 1 foot long and 1 foot wide. This is a **square foot**.

2. Draw upon the blackboard a rectangle 2 feet long and 1 foot wide. How many square feet in the rectangle?

3. How many square feet in a rectangle 2 feet wide and 3 feet long?

4. If 1 piece of your blackboard is 4 feet high and 5 feet long, how many square feet does it contain?

5. Draw a square upon the blackboard 1 yard long and 1 yard wide. This is a **square yard**.

6. A strip of carpet 1 yard wide and 2 yards long contains how many square yards?

7. A rug 3 feet wide and 4 feet long contains how many square feet?

8. Draw a square 1 foot long and 1 foot wide. Divide it into square inches. How many are there?

9. Draw upon the blackboard a square 1 yard wide and 1 yard long. Divide it into square feet. How many are there?

Remember :

> 144 square inches = 1 square foot
> 9 square feet = 1 square yard

10. How many square inches in 6 square feet?

11. How many square feet in 8 square yards?

12. How many square yards in 18 square feet?

1. How many pints in a quart?   In 4 qt.?   In 6 qt.?

2. How many quarts in a gallon?   In 5 gal.?   In 7 gal.?   In 9 gal.?

3. How many pints in a gallon?   In 6 gal.?   In 8 gal.?   In 10 gal.?

4. How many quarts in 16 pints?   In 18 pt.?

5. How many gallons in 20 quarts?   In 32 qt.?

6. A lady canned 24 gal. of fruit in quart jars.   How many jars did she use?

7. She had 32 quart jars of peaches.   How many gallons was that?

8. A canning factory put up each day 486 gal. of tomatoes in quart cans.   How many cans a day did it fill?

9. At that rate how many cans of tomatoes could the factory put up in 6 days?

10. A man made 198 gal. of maple syrup one year, and put it in quart bottles to sell.   How many bottles did he have?

11. If he had put it in pint bottles, how many bottles would he have had?

12. Mr. Johnson got 19 gal. of milk a day from his herd of cows.   How many quart bottles would that fill?

13. If he were to sell the milk for 8 cents a quart, how much money a day would he get?   How much a week?

14. If he were to sell 16 gal. of cream a month, how many pints would that be?

1. How many quarts in a peck? In 4 pk.? In 8 pk.?

2. How many pecks in a bushel? In 6 bu.? In 9 bu.?

3. How many quarts in a bushel? In 2 bu.? In 5 bu.?

4. How many pecks in 16 qt.? In 24 qt.? In 56 qt.?

5. How many bushels in 20 pk.? In 28 pk.? In 36 pk.?

6. If a man feeds his horse a peck of oats a day, how many bushels will it eat in 36 days?

7. If Charles feeds his pigeons 4 qt. of grain a day for 40 days to fatten them, how many quarts will he feed them in all? How many pecks is that? How many bushels?

8. A farmer feeds his turkeys 8 qt. of corn a day for 48 days to fatten them for the Thanksgiving market. How many quarts does he feed them in all? How many pecks? How many bushels?

9. If your mother pays 28 cents a peck for potatoes, how much is that a bushel?

10. If she pays 16 cents a quart for cranberries, how much is that a peck? How much a bushel?

11. A merchant bought 25 bushels of peaches, and then put them in peck baskets to sell. How many baskets did he use?

12. He had 3 pecks of blue plums which he put in quart boxes. How many boxes did he need?

13. How many quart boxes would he need to hold 5 pecks of lima beans?

1. How many ounces in a pound? In 5 lb.? In 8 lb.?

2. How many pounds in 32 oz.? In 64 oz.? In 80 oz.?

3. Pepper is put up in 2 oz. packages for sale. How many such packages can be made from a pound?

4. If one of these packages costs 5 cents, how much does the pepper cost a pound?

5. If your mother buys soda in an 8 oz. box for 5 cents a box, how much does she pay for a pound? Is that as cheap as to buy it in one-pound boxes at 9 cents a pound?

6. The cost of sending a sealed package by mail is 2 cents an ounce. If you mail a Christmas package weighing one pound to a friend, what does it cost?

7. If you mail a 2-pound sealed package, what does it cost you?

8. It costs 1 cent for each 2 ounces to send books by mail. How much is that a pound?

9. If you have the books that you buy sent to you by mail, and they weigh 3 lb., how much is the postage?

10. If a package mailed at the rate of 1 cent an ounce costs 32 cents, how many pounds does it weigh?

11. If a roast when cooked loses $\frac{1}{4}$ of its weight, how many ounces would a 2-lb. roast lose in cooking? How many ounces would a 3-lb. roast lose?

12. A recipe for tapioca pudding requires 2 oz. of butter. What part of a pound is that?

13. Change 4 lb. to ounces. Change 6 lb. Change 9 lb.

1. How many days in a week? In 4 wk.? In 10 wk.?

2. How many weeks are 56 days? 42 days? 63 days?

3. How many weeks in a year? In 9 yr.?

4. How many months in a year? Name them.

5. February, the shortest month, has 28 days. How many weeks?

6. Four of the months have 30 days each. How many days in all four of these months?

7. All of the other seven months have 31 days each. How many days in all seven of these months?

8. How many days in a year?

9. If it is 6 weeks until vacation, how many days is it?

10. If John sells an average of 36 papers a day, how many is that a week?

11. If a high school boy can earn $1.25 a day during his vacation, how much is that a week (6 days)?

12. If you go to school 36 weeks of the year, how many weeks of vacation do you have?

13. Certain years are one day longer than the others and are called *leap years*. All years that can be divided by 4 without remainder (except certain years ending in two zeros) are leap years. Find out which of the following will be leap years: 1924, 1934, 1942, 1944, 1956.

14. A person born on February 29, 1912, will have a birthday only once every 4 years (in leap years). How many birthdays will he have by the time he is 72 years old?

Add:

1.	2.	3.	4.	5.
672	904	160	$ 8.45	$ 12.75
589	367	798	6.72	24.35
408	145	436	1.87	16.86
961	723	209	5.10	42.39

Subtract:

6.	7.	8.	9.	10.
983	607	2562	$ 9.65	$ 75.40
495	249	875	3.85	31.65

Multiply:

11.	12.	13.	14.	15.
628	279	818	$ 8.65	$ 5.97
6	8	9	7	8

Divide:

16.	17.	18.	19.	20.
4)784	8)976	9)675	6)$ 9.84	7)$ 19.95

21. Make change from $5 for the following:

$ 2.64 $ 4.35 $ 1.87 $ 3.05 $ 0.86

22. Change 6 ft. to inches; 8 ft. to inches; 18 yd. to feet; 192 ft. to yards.

23. How many square inches in a square foot? In 8 sq. ft.?

24. How many ounces in 6 lb.? In 8 lb.? In 9 lb.?

1. If you start to the store with $4.90, and return with only $2.35, how much do you spend?

2. If you owe a bill of $3.85 at a store, and give the clerk a five-dollar bill to pay it, how much change should he give you?

3. If you go on a fishing trip, and the hooks and lines cost $1.95, car fare $2.18, and other expenses $3.86, how much does the trip cost you all together?

4. Mr. Bryan set 288 cabbage plants in 8 equal rows. How many did he set in each row?

5. Of the plants that he set out, $\frac{1}{9}$ wilted and died. How many did he lose? How many lived?

6. Of the remaining plants, $\frac{1}{8}$ were killed later by cut-worms. How many were thus killed? How many remained?

7. Each of the remaining plants grew a big cabbage head. Mr. Bryan sold these for 9 cents apiece. How much did he receive in all?

8. He paid out $4.65 for the plants and for hiring a boy to hoe them. How much did he have left for profit?

9. His son Arthur raised the tomatoes. He set out 144 plants and lost $\frac{1}{8}$ of them. How many did he lose?

10. Arthur sold the first tomatoes that ripened for 16 cents a pound. How much an ounce was that? What should he get for 14 oz.?

11. Arthur also raised peas. He picked 24 quarts in one morning. How many pecks?

1. John went swimming 27 times last summer, which was 9 more times than his neighbor Charles went. How many times did Charles go swimming?

2. John carried 4 buckets of coal a day for his mother. How many buckets a week? How many in 8 weeks?

3. His father allowed him 5 cents a day for spending money. How much a week? How much in the 8 weeks?

4. His sister Ruth gathered the eggs, and found an average of 9 eggs a day. How many a week did she find? The family ate 36 of the eggs a week, and sold the rest. How many a week did they sell?

5. Their mother set 9 hens in March, and put 12 eggs under each hen. How many eggs did she set? How many dozen?

6. She bought 6 dozen of the setting eggs at 45 cents a dozen. How much did they cost?

7. Of the eggs that were set 86 hatched chicks. The rats got 18 of these chicks. How many were left?

8. John and Ruth went on the train to their grandfather's 6 times during the year. The car fare was $2.88 each trip. How much was the car fare for all of the trips?

9. It was 72 miles to their grandfather's. How far did they ride on each trip? How far on all 6 trips?

10. How much less than 1000 miles did they travel?

11. John earned $9.75 during vacation. He wanted a bicycle that cost $21.50. How much more money did he need?

1. Five boys went camping. Their tent cost $24.75; fishing rods, lines, and hooks $3.45; cooking outfit $2.40; and food supplies $26.85. Find the total cost.

2. Find each boy's share of this expense.

3. They paid a farmer $2.45 for fresh eggs, $2.80 for milk, $1.75 for butter, and $1.60 for vegetables. How much did they pay him for all of these?

4. How much was each boy's share of this expense?

5. They slept each night from 8 o'clock in the evening to 5 o'clock the next morning. How many hours each day were they awake?

6. They took 8 lb. of bacon to the camp, and fried 8 oz. each morning for breakfast. How long did it last?

7. They caught 29 fish the first week, 37 the second, 18 the third, and 36 the fourth. How many did they catch in all? What was the average number caught each week?

8. They went swimming an average of 45 minutes each afternoon. How long were they in swimming each week? In all four weeks?

PRIMARY ARITHMETIC

PART THREE: FOURTH YEAR

1. Tell what each figure represents in these numbers:

246,   3465,   7340,   6304,   7035.

Write in figures:

2. One thousand, seven hundred, sixty-three.

3. Seven thousand, three hundred, seventy-nine.

4. Nine thousand, two hundred, seventy.

5. Eight thousand, sixty-eight.

6. Seven thousand, seventy.

7. Five thousand, five.

The fifth figure from the right, beginning with ones, represents **ten-thousands.**

The sixth figure, **hundred-thousands.**

---

8. 436,487 is read 436 *thousand,* 487.

Read the population of the following cities in 1910:

St. Louis,	687,029.	Boston,	670,585.
Cleveland,	560,663.	Detroit,	465,766.
Pittsburg,	533,905.	Buffalo,	423,715.

Reading numbers written in figures is **numeration.**

1. What *seven* letters are sometimes used to stand for numbers?

2. When do we use such a method of writing numbers?

3. *Give the value of each of the following:*

I   V   X   L   C   D   M

These letters are called the **Roman numerals**.

4. *Give the value of:*

I	VI (5 + 1)	XI (10 + 1)	LX (50 + 10)
II	VII	XX	LXX
III	VIII	XXX	LXXX
IV (5 − 1)	IX (10 − 1)	XL (50 − 10)	XC (100 − 10)
V	X	L	C

5. *Other numbers are written thus:*

$$20 + 3 = XX + III = XXIII = 23$$
$$40 + 5 = XL + V = XLV = 45$$
$$50 + 6 = L + VI = LVI = 56$$
$$60 + 7 = LX + VII = LXVII = 67$$
$$80 + 9 = LXXX + IX = LXXXIX = 89$$
$$100 + 6 = C + VI = CVI = 106$$

6. *Read the following numbers of chapters in a book:*

XIV	XXVII	XXXV	XLVIII	LXXXVI
XVI	XXIX	XXXVI	LXXI	XCVIII

7. *Learn the following:*

C = 100;	CX = 110	D = 500;	DXIV = 514
CC = 200;	CCL = 250	DC = 600;	DCLX = 660
CCC = 300;	CCCV = 305	M = 1000;	MM = 2000
CD = 400;	CDXX = 420	MD = 1500;	MCMV = 1905

1. Give rapidly the sums in the table on page 29.

2. Give rapidly the sums in the table on page 33.

3. Add 3 to each of the following:

<p style="text-align:center;">17, 27, 37, 47, 67, 87, 97.</p>

4. Add 4 to each of the numbers in Exercise 3.

5. To each of the numbers below add 2 ; 3 ; 4 ; 5 ; 6 ; 7 ; 8 ; 9.

| 22 | 56 | 87 | 42 | 84 | 72 | 39 | 23 | 85 | 67 | 69 | 79 | 25 |
| 94 | 62 | 47 | 24 | 55 | 32 | 63 | 89 | 34 | 78 | 49 | 96 | 52 |

Copy and add :

6. 24, 28, 36, 25, 34, 27.   8. 34, 44, 49, 34, 43, 46.

7. 22, 42, 57, 26, 31, 54.   9. 37, 62, 97, 78, 58, 96.

10. *Give the sum of each column :*

6397	5495	8264	3965	7149	2836
3487	3674	9832	4598	4376	8998
7767	4889	8976	4931	4897	7664
2459	8547	2364	5587	6938	6491
8975	4843	3623	7984	2654	3738

NOTE. — In adding, say as few words as possible. In the first column of Exercise 6, say 7, 11, 16, 22, 30, 34 ; or 4, 12, 18, 23, 27, 34, as you see the figures. Use time limits and work for accuracy and rapidity.

The **results**, or **answers**, of our work with numbers are useless unless they are correct. There are ways of **testing** or **checking** work.

> *We* **check** *addition by adding the numbers of each column in a reverse order, first upward, then downward, or first downward, then upward.*

Add, and check 346, 987, 368, 784.

WORK

346
987
368
784
―――
2485

CHECK: Adding each column upward, the sum is 2485. Then adding downward, the sum is 2485. So we feel sure that the work is correct.

Write in columns, add, and check:

1.	$3.74	$15.63	$68.40	$126.73	$964.25
2.	$4.56	$17.75	$59.17	$137.86	$832.92
3.	$5.78	$16.64	$48.52	$156.45	$761.86
4.	$6.90	$19.79	$97.33	$246.75	$864.47
5.	$7.12	$14.85	$65.24	$258.50	$635.94
6.	1975	7657	4877	7933	7693
7.	9287	7394	5295	5817	8769
8.	8738	8948	4686	6294	2456
9.	4179	9846	7578	9246	3478
10.	6526	8593	8369	7865	7057

```
43
86
29     38  sum of ones
34     32  sum of tens
76    358  sum of sums
38
52
358
```

In adding long columns, it is best to write the sums of each column at one side, or on separate slips, until the work is checked. Then write the sum of the sums in the proper place.

By practice your eye will catch two or more numbers that make 10. Learn to recognize quickly:

```
3      2      9      5      4
7      8      1      5      6
```

Also learn to recognize the following:

```
1    1    2    2    3    3    5    2
2    1    3    2    3    6    4    4
7    8    5    6    4    1    1    4
```

```
6
4
7
5
5
27
```

In adding this column, your eye should recognize 6 and 4, and 5 and 5, as groups of 10. Then adding the two 10's and 7 the sum is 27.

Add, trying to recognize groups of 10:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1	4	7	1	5	6	5	5	8	3
9	6	3	9	5	4	5	3	2	7
7	2	4	3	8	1	3	7	3	1
3	8	6	8	2	9	7	5	7	9
4	5	8	2	6	2	9	4	6	1

Practice until you can give all the sums in three minutes.

	A	B	C	D	E	F	G	H	I	J	K	L
1.	3	2	7	8	6	9	8	1	3	4	7	4
	8	5	3	2	3	1	4	1	3	3	8	9
	7	8	6	3	4	8	3	8	4	3	5	1
	2	5	9	6	1	3	6	2	2	5	3	6
	1	7	4	7	6	7	7	7	6	3	6	8
	4	6	2	5	2	6	1	3	8	6	4	2
	6	1	7	3	7	1	3	6	3	1	2	7
2.	6	9	8	5	2	7	8	1	2	2	2	5
	4	2	3	6	4	9	9	3	9	9	6	5
	1	6	8	9	9	8	6	8	1	1	4	9
	8	3	4	8	6	4	4	3	4	7	4	4
	5	4	5	1	3	7	3	6	7	6	8	1
	6	5	8	3	2	6	8	9	7	8	5	7
	9	7	9	7	1	9	9	7	6	6	6	9

NOTE. — Practice daily. Work with a time limit. Try to beat former records.

Add:

1. 235	2. 527	3. 871	4. 846
468	363	268	961
972	284	571	733
385	352	342	846
729	175	960	533

5–9. *Find the total attendance at school each day for a week from the following table:*

GRADE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
First	2608	2612	2598	2613	2589
Second	2478	2463	2472	2475	2477
Third	2413	2418	2419	2422	2420
Fourth	2369	2369	2371	2367	2369
Fifth	2357	2354	2358	2355	2354
Sixth	2216	2218	2218	2224	2219
Total					

10. The number of persons visiting a park one week was as follows: Sunday, 5268; Monday, 1028; Tuesday, 1726; Wednesday, 1803; Thursday, 1699; Friday, 1708; Saturday, 2675. Find the total attendance for the week.

11. The number of letters collected by a postman one week was as follows: Monday, 968; Tuesday, 765; Wednesday, 846; Thursday, 967; Friday, 848; Saturday, 896; Sunday, 799. Find the total number collected by him during the week.

Mr. Wilson and his family exhibited some of their fine animals, farm products, and fancy work at the state fair.

1. Mr. Wilson got prizes as follows: Buff Cochin pullet $3.25, pair of Pekin ducks $3.75, fat steer $25.00, one-year-old hog $12.50. What is the sum of these prizes?

2. Mrs. Wilson was awarded the following prizes on exhibits: crazy quilt $2.75, center piece $1.90, pillow $0.85, marble cake $2.65, quince preserves $1.75. Find the total of her prizes.

3. The expenses of the trip to the fair were as follows: railroad fares for Mr. and Mrs. Wilson $4.68 each, railroad fares for their son and daughter $2.34 each, hotel bill $24.95, admission tickets, refreshments, etc., $15.75. Find the total expense for the trip.

4. The attendance at the fair for the week was: Tuesday 16,497, Wednesday 18,069, Thursday 19,684, Friday 17,906, Saturday 14,927. What was the total attendance during the week?

1. The number of people visiting Central Park one week was as follows: Monday 592, Tuesday 608, Wednesday 894, Thursday 460, Friday 725, Saturday 680, and Sunday 4257. How many people visited the park during the week?

2. On one Sunday there were 1290 men, 1565 women, and 2190 children in a park. How many people were there in all?

3. In a park there are 197 wild animals in cages, 89 head of deer, buffalo, and other large animals, 48 monkeys, and 129 squirrels. How many all together?

4. Some people who spent the day in a park paid $1.20 for carfare, $2.65 for lunch, $1.85 for refreshments, $0.60 for hire of boats, and $0.75 for riding ponies. What did the outing cost?

5. Of the larger national parks of the United States, the Yellowstone Park contains 3348 square miles; Yosemite, Cal., 1512 square miles; Crater Lake, Oregon, 249 square miles; and Mount Rainier, Wash., 324 square miles. How many square miles in all of these parks?
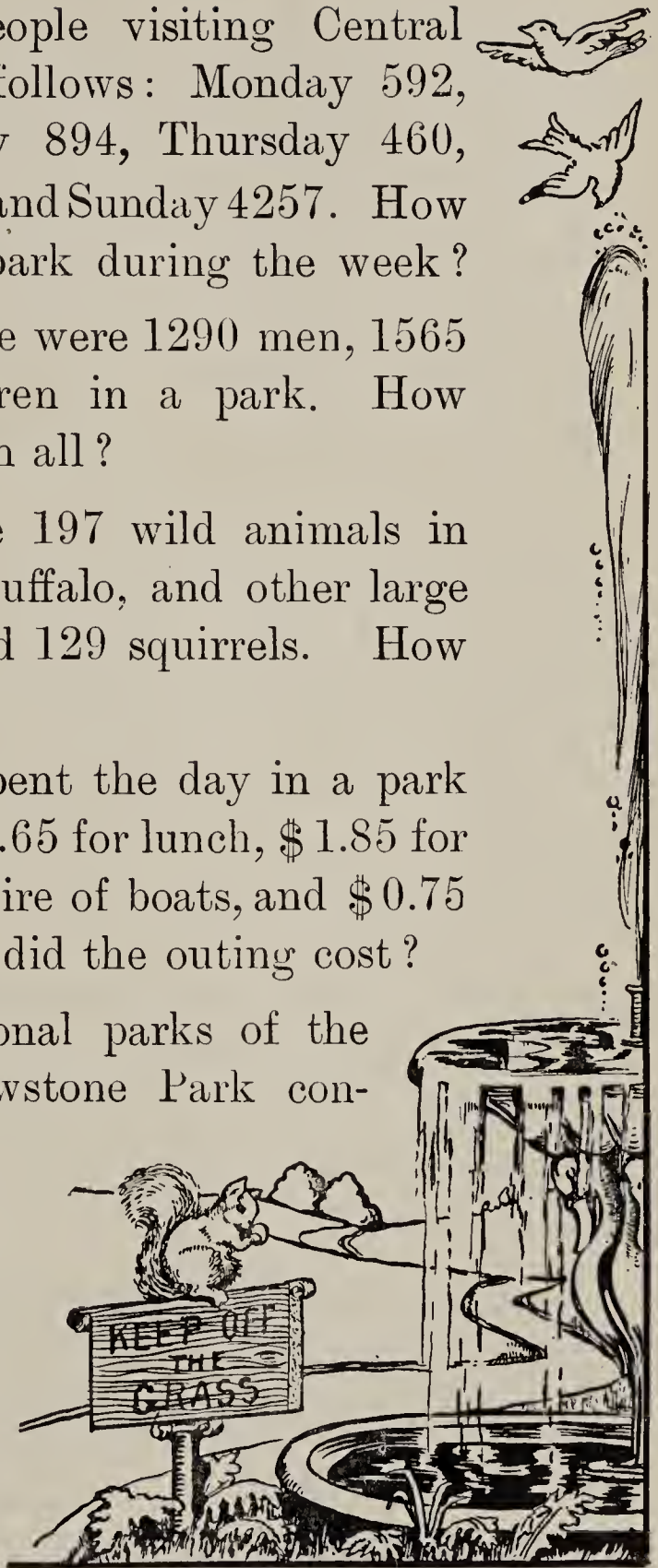
1.	2.	3.	4.	5.
$87.36	$38.96	$56.25	$28.45	$87.35
93.48	92.54	48.35	5.35	19.38
67.52	76.32	73.84	16.24	26.40
48.96	54.76	9.85	90.38	3.75
9.03	98.37	70.63	46.52	9.60
17.42	54.63	81.14	93.17	84.38
16.57	87.96	37.96	56.84	17.20

6. How many quarts of strawberries did a gardener gather in one week as follows: Monday 368 quarts, Tuesday 418 quarts, Wednesday 397 quarts, Thursday 308 quarts, Friday 417 quarts, and Saturday 298 quarts?

7. A boy earns the following sums in a week: 68 cents, 72 cents, 96 cents, 78 cents, 86 cents, 94 cents. What are his earnings for the week?

8. In one week a milkman delivered as follows: Monday 318 quarts, Tuesday 512 quarts, Wednesday 489 quarts, Thursday 476 quarts, Friday 488 quarts, Saturday 515 quarts, Sunday 473 quarts. How many quarts were delivered in all?

9. A merchant's bank deposits for the week were as follows: $876; $789; $918; $1073; $892; $1196. What were the total deposits for the week?

10. In seven days a boy delivered papers as follows: 133, 98, 101, 96, 89, 93, and 117. What was the total number delivered?

Without rewriting, begin where the teacher directs and add. Write the sums on a sheet of paper. Score 5 for each correct answer and see what score you can make in five minutes. Use this page and keep your score for several days.

	1.	2.	3.	4.	5.
A	947	576	615	857	194
	578	694	479	674	968
	896	438	826	146	635
	463	925	754	992	477
	125	148	398	538	582
	387	476	287	436	578
B	193	772	618	749	675
	859	695	774	857	496
	727	314	825	698	387
	646	948	546	364	952
	485	586	939	521	841
	736	729	643	768	298

1. Charles sold 89 copies of the Tribune, 78 copies of the Sun, 119 copies of the News, and 147 copies of the Herald in one week. How many papers did he sell in all?

2. A family's expenses last year were as follows: rent $480, taxes and insurance $348, clothing $236, food $540, fuel and lights $98, traveling and other expenses $219. Find the total expenses.

3. A family used 375 lb. of ice in June, 550 lb. in July, 625 lb. in August, and 485 lb. in September. Find the total amount used during the four months.

4. A man had four loads of coal put into his cellar. The first weighed 3495 lb., the second 3816 lb., the third 4187 lb., and the fourth 4218 lb. Find the total weight.

5. In a boys' corn-growing contest the following prizes were given: first prize $25, second prize $17.75, third prize $12.50, and the fourth prize $7.25. What was the whole amount of money given in prizes?

6. During the vacation Ralph earned $12.75 cutting lawns, $9.50 driving a delivery wagon on Saturdays, $6.98 as agent for a laundry, and $4.85 by other work. How much did he earn in all?

7. An excursion steamer on the Great Lakes makes a round trip in a week, touching points as follows: to the first stopping point 268 miles, to the second 97 miles, to the third 219 miles, to the fourth 198 miles, to the fifth 87 miles, to the sixth 385 miles, and then to the starting point 186 miles. Find the length of the entire trip.

Subtract each of the following numbers from 100, *without using a pencil :*

1. 11 88 44 74 52 70 36 13 60 75 37 48

2. 35 61 82 14 91 33 22 65 42 53 15 59

3. 83 30 23 57 89 43 95 29 90 32 84 26

4. 20 81 73 63 21 94 56 99 17 93 41 66

5. 36 19 62 45 96 18 50 46 76 40 71 62

6. Take 300 from 1000 ; 600 from 1100.

7. Take 250 from 500 ; from 750 ; from 1000.

Subtract as rapidly as possible without using a pencil :

8.
75	86	94	47	85	53	78	135	265
60	50	71	32	53	23	36	80	95

9.
539	827	396	417	824	391	864	249	618
408	325	190	95	704	270	453	127	93

10.
1246	3721	4986	5478	3966	2791	4865
300	600	880	5406	3900	2500	4105

Subtract :

11. 1756 from 4553.

12. 16924 from 86693.

13. 2349 from 4682.

14. 2025 from 8141.

15. 7659 from 15321.

16. 8347 from 9238.

17. 6705 from 9477.

18. 4038 from 6841.

19. 5467 from 7238.

20. 3094 from 6243.

In subtraction, the number subtracted is called the **subtrahend**.

The number from which we subtract is called the **minuend**. The result is called the **difference** or **remainder**.

1. Find the difference between 4653 and 1796.

4653 Minuend
1796 Subtrahend
2857 Difference

2. Add 2857 and 1796.

3. Compare the result with the minuend.

4. In exercise 1 what is 1796 called? What is 2857 called?

To test or check subtraction we see whether the sum of the subtrahend and difference is equal to the minuend.

Find the difference and check:

5. Take 3486 from 9638.
6. Take 6964 from 8371.
7. Take 3739 from 6297.

8. Take 3269 from 5847.
9. Take 1763 from 9376.
10. Take 2365 from 8430.

11.	12.	13.	14.	15.
3465	4621	8463	8347	3468
1738	1705	1927	2961	1299

16. Take 3465 from 7182.
17. Take 1978 from 6347.
18. Take 2376 from 7849.
19. Take 4882 from 8641.

20. 4679 − 2834.
21. 3294 − 789.
22. 3562 − 1987.
23. 7832 − 2985.

1. From 7000 take 3654.

WORK	EXPLANATION. — To get a number from which to take
7000	the 4, one of the 7 thousand was changed to the next place
3654	to the right, making 10 and leaving 6 in thousands' place;
3346	one of the 10 was then changed to the next place to the right, leaving 9; and so on.

Subtract:

2.	3.	4.	5.	6.
8000	9000	10000	6000	7000
2634	2738	2685	1542	1340

7.	8.	9.	10.	11.
9600	8400	7500	8700	9300
1834	3692	1638	1962	8296

12.	13.	14.	15.	16.
9603	8402	8501	8707	9603
2836	1735	1962	4958	8975

17. 6003 − 4865.

18. 7004 − 5386.

19. 8005 − 6739.

20. 5001 − 2834.

21. 7005 − 6839.

22. 8007 − 7968.

23. 7001 − 6892.

24. 5900 − 3690.

25. 6500 − 2840.

26. 7035 − 5296.

27. 8034 − 6785.

28. 9072 − 7684.

29. 3806 − 1957.

30. 2807 − 1986.

31. 3026 − 2845.

32. 5067 − 4892.

33. 6084 − 5896.

34. 4037 − 3989.

Without rewriting, begin where the teacher directs, and subtract. Write the remainders on a piece of paper. Score 5 for each correct answer and see what score you can make in five minutes :

	1.	2.	3.	4.	5.	6.
A	7463	5280	6503	5216	7819	5678
	2581	3824	2791	4325	3564	1987
B	6083	3476	5000	6008	9315	1728
	4295	1698	2345	3527	6832	1296
C	3207	8194	7010	8641	3141	5261
	1626	2356	3406	5207	1727	1840
D	8146	5181	7210	3000	6000	8090
	3279	4936	1658	1579	2503	6428
E	6040	7201	9215	3081	1492	1776
	2565	5863	3692	1693	1208	1492
F	5280	3895	1608	4000	6203	9876
	1765	1697	1192	1357	2471	6789

1. Can you tell the temperature of the air by looking at the thermometer?

2. Tell the temperature as shown on the thermometer in the picture.

3. Tell the temperature as shown by the thermometer in the schoolroom.

4. At what temperature does water freeze?

5. 32 degrees is written 32°. Subtract 32° from the temperature of the room and see how much above freezing it is.

6. The temperature of your body is about 98°. How much is that above freezing?

7. Water boils at 212°. How much is that above the temperature at which it freezes?

8. At 6 o'clock in the morning the thermometer stood at 63°. By 4 o'clock P.M. it had fallen to 47°. How many degrees did it fall?

9. When it is 68° in the room and 39° out of doors, how much colder is it out of doors?
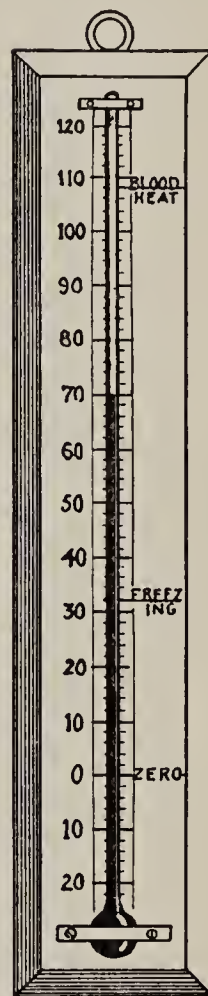
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Highest . . .	86°	81°	79°	74°	84°	82°
Lowest . . .	78°	77°	68°	68°	69°	73°

10. Find the difference between the highest and lowest temperature for each day given in this table.

1. What is a bank? Have you seen people put money in a big bank or take money out?

2. Mr. Jones had $2715 in the bank, and drew out $947. How much did he have left in the bank?

3. Mr. Wallace was a grocer. He deposited in the bank every day all of the money that he took in at the store. During one week he put in the bank $165.45, $127.80, $216.50, $195.65, $284.37, and $340.50. How much did he put into the bank in the whole week?

4. At the end of the week Mr. Wallace paid his bills. These were $147.35, $63.85, $12.45, and $33.33. How much money did it take? To pay the bills he took money out of the bank. How much did he save that week?

5. If your father had $960 in the bank, and drew out $175, how much would he have left in the bank?

6. If he drew out $286 more, how much would he then have left in the bank?

7. Charles put his earnings in a savings bank. One week he put in $1.65, the next $1.47, the next $2.18, and the next $1.95. How much did he then have in the bank?

8. Henry had $18.35 in the bank. When he started on his vacation, out of the city, he drew out $8.50. How much did he have left in the bank?

1. One part of $3.94 is $1.51; find the other part.

2. Add $1.59, $6.24, $8.37, and $5.62.

3. $369 + 542 + 387 + 921 - 849 = \underline{\hspace{1cm}}$.

4. $4783 - 927 - 342 - 871 = \underline{\hspace{1cm}}$.

5. Find the sum of $4.76, $2.57, and $1.75.

6. Edward received $8.32 at one time and $1.65 at another. He paid out $4.19. What had he left?

7. A farmer has 38 acres of corn, 41 acres of wheat, and 19 acres of meadow. How many acres has he in all?

8. My pony cost $48, the harness $16, and the phaeton $65. What did all this cost me?

9. A farmer raised 1600 bushels of wheat and sold 786 bushels. How much had he left?

10. A postal clerk has 396 letters for Boston, 396 for New York, 1240 for Chicago, 209 for Washington, and 3627 for other places. How many letters has he in all?

11. James has $39.42; Henry has $14.36; Paul has as much as both James and Henry. How much money has Paul?

12. Take 368 from the sum of 246 and 397.

13.	14.	15.	16.	17.
915	283	374	263	876
347	527	639	647	849
738	982	874	672	764
728	129	937	804	374

1. When you write a letter to your cousin in a distant city, how do you get it to him?

2. There were 36 letters put into the box on one corner Monday, 47 Tuesday, 39 Wednesday, 56 Thursday, 40 Friday, and 48 Saturday. How many in all six days?

3. On one trip the mail collector gathered from the different boxes the following numbers of letters: 12, 48, 27, 19, 35, 51, 47, 38, 26, and 46. How many did he collect on the trip?

4. One day Mr. Smith, a business man, put into the mail box on his corner 168 one-cent letters, 184 two-cent letters, and 29 packages. How many pieces in all?

5. What was the postage on all of the one-cent letters that Mr. Smith mailed? On the two-cent letters?

6. The postage on each package was 7 cents. What was the postage on all of the packages?

7. How much did all the postage cost Mr. Smith?

8. Mary took Christmas gifts to the post-office and mailed them. The postage on one package was 28 cents, on another 35 cents, on another 19 cents, on another 47 cents, and on another 38 cents. How much was all of the postage?
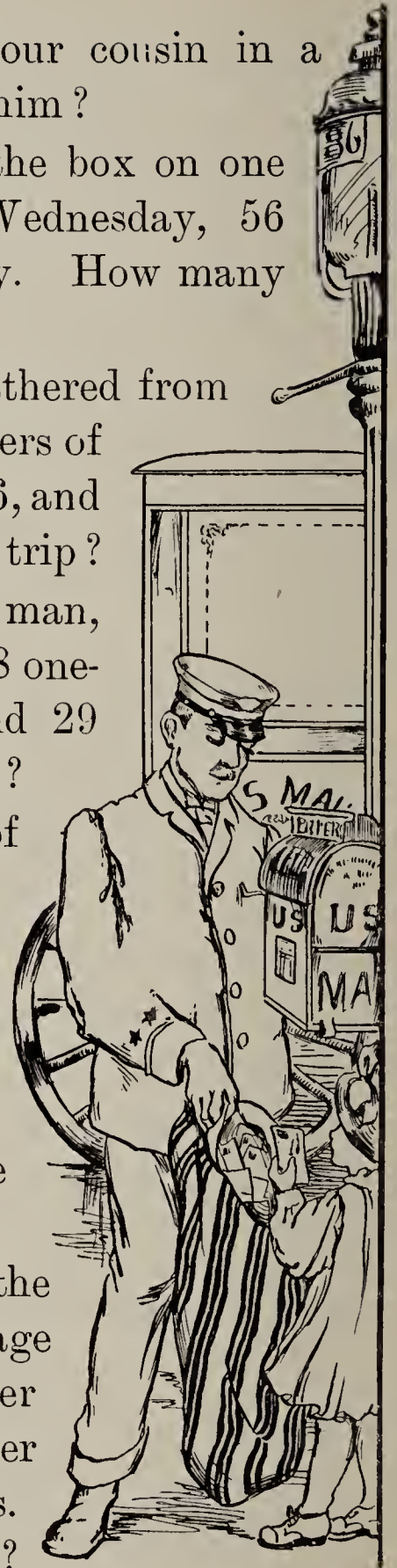
1. A man paid $125 for a pony and $56 for a phaeton, and sold them both for $16 more than they cost him. What did he get for them?

2. In a small city are four ward schools. In one school are 417 pupils, in another 563, in another 398, and in the fourth 619. How many pupils are enrolled in the four schools?

3. A man paid $540 for a lot. He built a house on it costing $2340, a barn costing $982, spent in grading the lot $23, and paid $86 for walks. What was the total cost of the property?

4. A boy made a chair valued at $8.75, a book rack valued at $2.25, and two small tables valued at $3.10 each. Find the value of all four articles.

5. A school savings bank made 6 deposits as follows: $16.30; $25; $18.19; $9.65; $20.50; $16.64. Find the total deposits.

6. A merchant's sales for the week were as follows: Monday $368, Tuesday $419, Wednesday $396, Thursday $463, Friday $411, Saturday $763. What were the total sales for the week?

7. I bought three loads of coal containing the following number of pounds: 5268 pounds, 4973 pounds, 5098 pounds. How many pounds did I buy?

8. A man paid $756 for a building lot and paid out for lumber to build a house, $936, to the workmen $538, for other material $498. Find the total cost of the property.

1. Each spring our school has a field day at which the children contest in foot races, jumping, etc. There were 36 children in the games this year, and only 17 last year. How many more were there this year than last year?

2. The 180-yard dash was made in 28 seconds this year and in 33 seconds last year. How much was the record lowered this year?

3. The 440-yard run was made this year in 68 seconds and last year in 75 seconds. How much was the record lowered this year?

4. John put the shot 36 feet and Charles put it 41 feet. How much farther did Charles put the shot than John?

5. Ralph threw a weight 94 feet this year. The record for the year before was 87 feet. How much did Ralph raise the record?

6. If you could stand and jump 23 inches high last

year, and at this year's field day you could jump 31 inches high, how much did you raise your record?

7. In a recent year the world's record in the 440-yard run was 47 seconds. If you can run this distance in 72 seconds, how much longer does it take you than the world's champion runner?

8. The world's record for the standing broad jump was 138 inches. If you can stand and jump 63 inches, this is how much less than the world's record?

9. The world's record for throwing a 16-pound hammer was nearly 180 feet. If the record of your school in throwing the hammer were 57 feet, that would be how much less than the world's record?

10. The world's record in putting the 12-pound shot was made by Ralph Rose. He put the shot nearly 56 feet. He also put a 24-pound shot about 38 feet. How much farther did he put the smaller shot?

11. Four boys run a relay race. If one runs 47 seconds, another 46 seconds, the third 51 seconds, and the fourth 49 seconds, how long does it take to run the race?

12. How many seconds are there in a minute? In 3 minutes? How much more than 3 minutes does it take the boys to run the relay race in Problem 11?

13. Four high school boys in Chicago recently ran a 1-mile relay race in 219 seconds. How much more than 3 minutes was this?

1. This table gives the attendance of the four lower grades of a school for one week. Find the total attendance of all grades on each day, and the total attendance of each grade for the week.

GRADE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
First	68	65	70	71	69
Second	63	64	68	59	66
Third	57	60	55	58	59
Fourth	52	54	55	51	57

2. Find the total area of the five Great Lakes:

Lake Michigan,   22,540 square miles
Lake Erie,   9,960 square miles
Lake Huron,   23,800 square miles
Lake Ontario,   7,240 square miles
Lake Superior,   31,200 square miles

3. The area of Illinois is 56,665 square miles. How much larger is Illinois than Lake Michigan?

4. Texas is the largest state, and contains 265,896 square miles. How much larger is Texas than all five of the Great Lakes together?

5. The length of Lake Michigan is 330 miles, of Lake Erie 270 miles, of Lake Huron 250 miles, of Lake Ontario 180 miles, and of Lake Superior 380 miles. Find their combined lengths.

1. Where does your coal come from ?

2. If you buy 8500 lb. of coal in the fall, 7640 lb. in the winter, and 6680 lb. in the spring, how many pounds do you buy in a year ?

3. If you pay $22.75 for the coal bought in the fall, $18.40 for that bought in the winter, and $16.25 for that bought in the spring, what does your year's supply of coal cost you ?

4. A driver delivers in one day 3240 lb. of coal at one place, 2860 lb. at a second place, 3490 lb. at a third place, and 3720 lb. at a fourth place. How much does he deliver during the day ?

5. A dealer sold 6000 lb. of coal to a customer. The driver has delivered 4010 lb. How much more must he deliver ?

6. A driver weighed a load of coal in the wagon. The coal and wagon weighed 4864 lb. The wagon was known to weigh 1170 lb. How much coal was on the wagon ?

7. A dealer bought four carloads of coal at the mine. The weights of the loads were: 54,640 lb., 48,835 lb., 42,790 lb., and 50,180 lb. How many pounds in all ?

8. A coal dealer pays $4.65 a ton for coal and sells it at $6.25 a ton. How much does he make on a ton ?
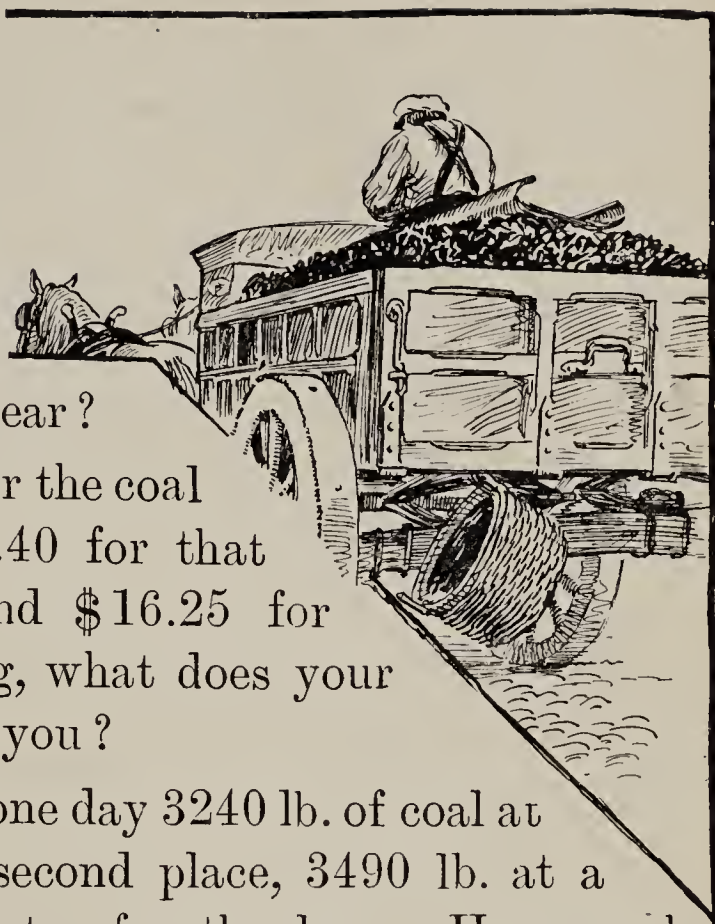
1. How many days in 52 weeks?

2. How many quart bottles can a dairyman fill from 96 gallons of milk?

3. If a man feeds his horse a peck of oats each day, how long will 84 bushels last?

4. A man sold 6 barrels of apples at $3.85 a barrel. How much did he get for them? In what two ways can you find the answer?

Multiply :

5.	6.	7.	8.	9.
3465	4973	5674	9376	4673
7	8	7	8	9

10.	11.	12.	13.	14.
2996	3762	4368	2467	5438
8	9	8	6	9

15. If a dealer sells 6 horses at $245 each, how much does he get for them?

16. A bushel of onions weighs 57 lb. Find the weight of 6 bu. Of 7 bu. Of 8 bu. Of 9 bu.

17. If an automobile goes 35 miles in an hour, how far will it go in 5 hours? In 7 hours? In 9 hours?

18. Find the cost of 7 sleds at $2.65 each.

19. Find the cost of 8 pairs of skates at $1.45 a pair.

Without rewriting, begin where the teacher directs, and multiply.   Write the products on a piece of paper.   Score 5 for each correct answer, and see what score you can make in five minutes :

	1.	2.	3.	4.	5.	6.
A	8224 ×2	6143 ×4	5281 ×3	7684 ×5	3192 ×6	8342 ×8
B	1728 ×7	3465 ×4	7289 ×6	3406 ×5	7824 ×9	3086 ×8
C	2875 ×7	8146 ×6	7208 ×9	3570 ×6	5982 ×4	7009 ×9
D	3864 ×5	9080 ×8	1492 ×7	1776 ×9	3456 ×5	2687 ×6
E	9307 ×4	2158 ×7	3108 ×9	7666 ×5	8061 ×3	7284 ×2
F	5088 ×6	3870 ×8	9684 ×9	3587 ×7	7777 ×5	3456 ×4

A little girl had a doll house which her brother made for her. It had a living room, dining room, kitchen, and two bedrooms. Her father bought furnishings for it at a toy store.

1. He bought 4 rugs at 25¢ each and 6 pictures at 15¢ each. How much did all cost?

2. For the dining room he bought a table at 15¢, a set of dishes at 25¢, and 6 chairs at 10¢ each. How much did all cost?

3. For the living room he bought a couch at 25¢, a table at 25¢, a piano for 60¢, and 5 chairs at 10¢ each. How much did all cost?

4. For the bedrooms he bought 2 beds at 25¢ each, 2 mirrors at 10¢ each, 2 dressers at 15¢ each, and 4 chairs at 10¢ each. How much did all cost?

5. He also bought a kitchen cabinet for 25¢, a stove for 25¢, material for curtains for 20¢, a doll buggy for 85¢, and 6 little dolls at 15¢ each. How much did all these cost?

6. How much did all of the furnishings for the house cost? If the man who bought them handed the clerk a $10 bill, how much change should he receive?

7. If the toy dealer bought his 10¢ toys for 7¢ each, how much did he make on a dozen? On 3 dozen? On 5 dozen?

8. If he paid 9¢ each for the 15¢ toys, how much did he make on a dozen? On 5 dozen? On 6 dozen?

Find the product of:

1. 5×368.	11. 4×897.	21. 3×978.
2. 6×784.	12. 4×654.	22. 3×654.
3. 7×896.	13. 8×193.	23. 4×321.
4. 5×479.	14. 9×861.	24. 5×521.
5. 7×345.	15. 9×754.	25. 6×932.
6. 6×965.	16. 9×932.	26. 7×849.
7. 8×721.	17. 7×809.	27. 8×963.
8. 8×349.	18. 8×708.	28. 9×724.
9. 8×865.	19. 9×981.	29. 6×997.
10. 7×275.	20. 7×649.	30. 7×838.

31. A farmer sold 8 calves at $ 9.85 each. How much did he get for them?

32. In a corn-growing contest one boy raised 126 bushels on one acre. At that rate, how much could a farmer raise on a 9-acre field?

33. In a beet-growing contest in Illinois one boy received $ 71.19 for the beets grown on one acre. At this rate, how much would he receive from an 8-acre field?

34. In a corn-growing contest in South Carolina a fifteen-year-old boy raised 228 bushels of corn on an acre. At this rate how much would a 5-acre field produce?

35. The world's record in corn-growing is 255 bushels from a single acre. How much would a 9-acre field produce at that rate?

1. If you buy 8 oranges of a fruit vender at 5¢ apiece, how much do they cost?

2. How much will a dozen peaches cost at 3 for 10¢?

3. What is the cost of 3 pineapples at 15¢ each?

4. How much will 3 bananas cost at 20¢ a dozen? How much will 9 cost?

5. James bought a half-dozen apples of a fruit vender at 2 for 5¢. How much did they cost?

6. If your mother buys 4 oranges when they are 45¢ a dozen, and 7 pineapples at 12¢ each, how much do they all cost?

7. If a fruit vender buys four bunches of bananas at $1.35 a bunch, how much do they cost him?

8. If each bunch contains 9 dozen, how many dozen in the four bunches?

9. If he sells them at 20¢ a dozen, how much does he get for one bunch?

10. How much does he make on one bunch? How much on 4 bunches?

11. He bought 12 pineapples for 75¢ and sold them at 10¢ each. How much did he make?
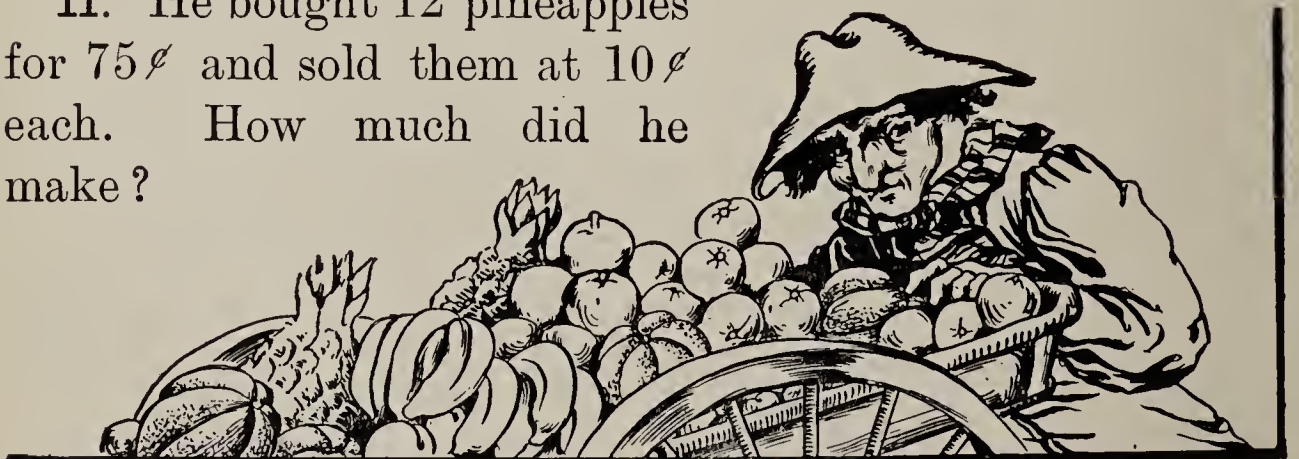
1. *Give quickly :*

32 ÷ 8	49 ÷ 7	24 ÷ 6	36 ÷ 9	72 ÷ 8	63 ÷ 7
42 ÷ 6	81 ÷ 9	64 ÷ 8	45 ÷ 5	48 ÷ 6	54 ÷ 9
63 ÷ 9	56 ÷ 8	27 ÷ 9	48 ÷ 8	35 ÷ 5	72 ÷ 9

2. *Give quotients and remainders :*

37 ÷ 8	45 ÷ 6	80 ÷ 9	60 ÷ 7	28 ÷ 5	44 ÷ 6
21 ÷ 9	68 ÷ 7	49 ÷ 8	56 ÷ 9	27 ÷ 4	37 ÷ 8
49 ÷ 5	35 ÷ 9	61 ÷ 7	47 ÷ 8	52 ÷ 9	40 ÷ 7

Divide :

3.	6.	9.	12.	15.
2)7864	4)9084	6)9036	4)3824	8)1096

4.	7.	10.	13.	16.
3)5619	5)2685	7)6517	9)2196	7)9205

5.	8.	11.	14.	17.
6)7284	8)4896	9)7587	6)7134	5)9280

18. A man raised 768 bushels of corn on an 8-acre field. How many bushels was that an acre?

19. A man sold $525 worth of watermelons from a 7-acre field. How much an acre did he get for the melons?

20. If he got an average of 4 melons from each vine, how many vines would it take to produce 1560 melons?

21. There are 1380 melons in a carload. They are sold at the rate of 6 for a dollar. What is the value of the carload?

Without rewriting, begin where the teacher directs, and divide. Write the quotients on a piece of paper. Score 5 for each correct answer and see what score you can make in five minutes :

A	2)6534	3)7284	5)2785	8)7344
B	6)4926	9)5760	2)7466	5)9080
C	3)5073	8)4904	6)5190	7)2968
D	5)7285	4)6108	7)3962	9)2106
E	8)4296	6)8502	3)2970	5)8035
F	4)6016	7)2065	8)5704	8)1000
G	9)1728	5)4675	4)1448	7)4095
H	7)9016	8)1112	6)2076	5)9200
I	6)4074	4)6000	8)1296	3)1074

1. Mrs. Martin canned 276 quart jars of fruit last summer. How many gallons were there?

2. A man feeds his pigs 6 bushels of corn each day. How long will 408 bushels last?

3. Arthur and his father drove in their automobile 704 miles in 8 days. Find the average distance they drove each day.

4. The population of a town is 8310. One sixth of the people were born in foreign countries. How many of the people were foreign born?

5. In a corn-growing contest Charles learned how to make the soil yield $\frac{1}{6}$ more corn than before. His father raised a crop of 2754 bushels. How many more bushels could he have raised if he had used Charles's method?

6. Charles raised 140 bushels of corn on his acre, while his father raised 1080 bushels on a 9-acre field. How much did his father raise on an acre? Did Charles raise $\frac{1}{6}$ more than this?

7. In the corn-growing contest a sum of $288 was divided into three prizes. The first prize was $\frac{1}{2}$ of that amount, the second $\frac{1}{3}$ of it, and the third $\frac{1}{6}$ of it. Find the amount of each prize.

8. For helping his father tend the corn one summer, John was to receive $\frac{1}{8}$ of the crop as his own. The crop was 1296 bushels. How many bushels did John get?

9. A man who had 640 acres of land sold $\frac{1}{4}$ of it. How many acres did he sell?

1. *Multiply:*

11	11	11	11	11	11	11	11	11
2	3	4	5	6	7	8	9	10

2. Since $2 \times 11 = 22$, $11 \times 2 =$ what?

3. Write out and memorize the table of 11's.

4. Multiply 345 by 11.

$$\begin{array}{r} 345 \\ 11 \\ \hline 3795 \end{array}$$

Multiply as with a number of one figure.
$11 \times 5 = 55$. Write 5 and add 5 to 11×4.
$11 \times 4 + 5 = 49$. Write 9 and add 4 to 11×3.

Multiply:

5.	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**
356	368	426	483	376	934	826
11	11	11	11	11	11	11

12. *Divide:*

$11)\overline{22}$　　$11)\overline{44}$　　$11)\overline{66}$　　$11)\overline{55}$　　$11)\overline{77}$　　$11)\overline{88}$　　$11)\overline{99}$

13. Write out and learn the division table of 11's.

Table of 11's

$11 \times 1 = 11$	$11 \times 6 = 66$	$11 \div 11 = 1$	$66 \div 11 = 6$
$11 \times 2 = 22$	$11 \times 7 = 77$	$22 \div 11 = 2$	$77 \div 11 = 7$
$11 \times 3 = 33$	$11 \times 8 = 88$	$33 \div 11 = 3$	$88 \div 11 = 8$
$11 \times 4 = 44$	$11 \times 9 = 99$	$44 \div 11 = 4$	$99 \div 11 = 9$
$11 \times 5 = 55$	$11 \times 10 = 110$	$55 \div 11 = 5$	$110 \div 11 = 10$

14. Remember these:　　$11 \times 11 = 121$　　　$121 \div 11 = 11$

1. *Multiply :*

12	12	12	12	12	12	12	12
2	3	4	5	6	7	8	9

2. Since $4 \times 12 = 48,$ $12 \times 4 =$ what ?

3. Write out and memorize the table of 12's.

4. Multiply 246 by 12.

    246   Multiply by **12** as by a number of one figure.
     12
    ————
    2952

Multiply :

5.	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**
426	537	642	753	832	942	763
12	12	12	12	12	12	12

12. *Divide :*

12)24 12)36 12)48 12)60 12)72 12)84 12)96 12)108

13. Write out and memorize the table of 12's in division.

Table of 12's

$12 \times 1 = 12$	$12 \times 6 = 72$	$12 \div 12 = 1$	$72 \div 12 = 6$
$12 \times 2 = 24$	$12 \times 7 = 84$	$24 \div 12 = 2$	$84 \div 12 = 7$
$12 \times 3 = 36$	$12 \times 8 = 96$	$36 \div 12 = 3$	$96 \div 12 = 8$
$12 \times 4 = 48$	$12 \times 9 = 108$	$48 \div 12 = 4$	$108 \div 12 = 9$
$12 \times 5 = 60$	$12 \times 10 = 120$	$60 \div 12 = 5$	$120 \div 12 = 10$

14. Remember these : $12 \times 11 = 132$ $12 \times 12 = 144$

1. How many men in 2 football elevens? In 3 teams? In 4 teams? In 5 teams?

2. A school had a first, second, and third football team. How many men in all of the teams?

3. There are 33 boys who play together in a neighborhood. How many football teams can they organize?

4. If the suit of each man on a football eleven costs $2.85, how much does it cost to get suits for all of the team?

5. If a pair of football shoes cost $3.95, how much does it cost to get shoes for the whole team?

6. Each man on a football eleven bought a jersey costing $5. How much was spent for all the jerseys?

7. How many plants can be set in 3 rows, if there are 11 plants in a row? In 4 rows? In 5 rows? In 6 rows? In 7 rows? In 8 rows? In 9 rows? In 10 rows?

8. Draw diagrams to show how many square inches there are in a rectangle 11 inches long and 3 inches wide; 4 inches wide; 7 inches wide; 9 inches wide.

9. How many things in a dozen? In 2 dozen? In 3 dozen? In 4 dozen? In 5 dozen? In 6 dozen? In 7 dozen? In 8 dozen? In 9 dozen? In 10 dozen? In 11 dozen? In 12 dozen?

10. A fruit vender bought oranges at 35¢ a dozen and sold them for 5¢ apiece. How much did he make on a dozen?

11. How many months in 8 years? In 9 years?

1. 10×4 is the same as $4 \times$ ——.

2. $10 \times 5 =$ ——; $10 \times 6 =$ ——; $10 \times 8 =$ ——.

A zero annexed to the right of a whole number changes the " ones " to " tens " and multiplies the number by 10.

---

3. *Give the products quickly :*

10×14	10×36	10×20	10×63	10×67
10×15	10×45	10×47	10×39	10×90
10×23	10×21	10×15	10×70	10×84

4.

2×3 or $3 \times 2 =$ ——.

20×3 or $3 \times 20 =$ ——.

5.

4×2 or $2 \times 4 =$ ——.

40×2 or $2 \times 40 =$ ——.

6. *Give products quickly :*

20×4	40×4	20×7	70×2	90×2
30×3	30×5	30×8	80×3	80×7
30×4	60×3	40×6	90×7	60×9

7. When you find 70×8 what do you first think ? What do you do next?

We see then that to multiply a number by 70, we first multiply by 7, and then annex a 0.

Multiply :

8. 30×46.   12. 70×69.   16. 80×67.

9. 80×57.   13. 80×39.   17. 90×54.

10. 70×63.   14. 60×93.   18. 80×37.

11. 80×94.   15. 70×74.   19. 70×89.

1. 3 times 4 and 2 times 4 are how many 4's?

2. 5 times 8, 3 times 8, and 2 times 8, are how many times 8?

3. 20 times 8 and 5 times 8 are how many times 8?

4. 20 times 32 and 4 times 32 are how many times 32?

5. Then you can find 24 times 32 by finding 20 times 32 and 4 × 32 and adding; thus, —

$$
\begin{array}{r} 32 \\ \times\,20 \\ \hline 640 \end{array}
\qquad
\begin{array}{r} 32 \\ \times\,4 \\ \hline 128 \end{array}
\qquad
\begin{array}{r} 128 \\ +\,640 \\ \hline 768 \end{array}
$$

We do not need to do so much written work.   While we are really doing the work under A, we write only that under B.

A	B
Think this:	*Write this:*

$$
\begin{array}{l}
32 \\
\underline{24} \\
128 = \text{product of } 4 \times 32 \\
640 = \text{product of } 20 \times 32 \\
\overline{768} = \text{product of } 24 \times 32
\end{array}
\qquad
\begin{array}{l}
32 \\
\underline{24} \\
128 \\
\underline{64} \\
768
\end{array}
$$

NOTE. — See that the abridged form under B is understood to mean the same as the complete form under A.   Show that the position of 6 and 4 shows that they mean 640 and hence that 0 may be omitted.

Multiply :

6. 34 × 23. **10.** 75 × 83. **14.** 64 × 58. **18.** 67 × 123.

7. 47 × 45. **11.** 82 × 93. **15.** 85 × 36. **19.** 89 × 138.

8. 58 × 67. **12.** 93 × 47. **16.** 98 × 76. **20.** 95 × 245.

9. 63 × 78. **13.** 87 × 69. **17.** 85 × 35. **21.** 47 × 783.

1. When a man earns $75 in a month, how much does he earn in a year?

2. My house rent is $32 a month. What do I pay in 2 years or 24 months?

3. A farmer sold 84 young cattle at $26 each. How much did he get for them?

4. If each acre produces 28 bushels of wheat, what does a farmer get from 48 acres?

5. A dealer bought 18 sofas at $13.50 each. What did they cost him? What did he make on all if he sold them at $21.50 each?

6. A man bought a fruit farm of 26 acres at $245 an acre. What did it cost him?

7. A man has 26 rows of apple trees in an orchard. If he gathers 98 bushels from one row, what may he expect from the whole orchard?

8. If we use 26 pounds of coffee a year and it costs 38 cents a pound, find the cost of our coffee for a year.

9. If we spend 64 cents a week for butter, how much do we spend for butter in a year (52 weeks)?

10. A family uses 48 pounds of lard a year. Find the cost at 16 cents a pound.

11. A family uses 19 sacks of flour a year. Find the cost at 87 cents a sack.

12. What is the cost of 96 bbl. of flour at $4.75 per barrel?

13. Find the cost of 84 desks at $3.85 each.

Find the products of :

1.	2.	3.	4.	5.
345	168	927	765	631
43	32	42	53	54

6.	7.	8.	9.	10.
695	309	420	543	635
65	87	65	87	27

11. 47×368.
12. 53×785.
13. 76×387.
14. 95×786.
15. 87×984.
16. 96×783.
17. 84×654.
18. 98×632.
19. 78×892.
20. 43×767.
21. 65×836.
22. 82×793.
23. 91×864.

24. 18×376.
25. 27×546.
26. 93×872.
27. 82×764.
28. 94×196.
29. 87×279.
30. 89×697.
31. 84×732.
32. 96×846.
33. 74×963.
34. 81×785.
35. 36×540.
36. 75×832.

37. 57×746.
38. 82×954.
39. 17×936.
40. 28×347.
41. 36×621.
42. 38×749.
43. 42×635.
44. 48×595.
45. 52×368.
46. 72×199.
47. 96×344.
48. 79×185.
49. 63×940.

50. A farmer had 43 acres of wheat that averaged 38 bushels to the acre. How many bushels in all?

51. A farmer had 29 acres of corn that averaged 95 bushels to the acre. How many bushels in all?

52. A man received 45 cents a bushel for picking cranberries. How much did he earn by picking 38 bushels?

At a candy store, the prices of candy are as follows:

Kind of Candy	Price per Pound	Price per 2-lb. Box	Price per 5-lb. Box
Caramels	$ 0.35	$ 0.60	$ 1.50
Nut Candy	.30	.55	1.35
Chocolate Creams . . .	.40	.70	1.65
Fudge	.25	.45	1.00
Stick Candy	.20	.40	.85

1. How much do I save by buying a 2-pound box of caramels instead of buying two 1-pound boxes?

2. How much cheaper is a 5-pound box of caramels than five 1-pound boxes?

3. How much do one 1-pound box and two 2-pound boxes of nut candy cost?

4. How much cheaper is a 5-pound box of chocolate creams than five 1-pound boxes?

5. Make up other problems from the above table.

6. A candy store made 26 pounds of nut candy one day and sold it at 29 cents a pound. Find the amount received for it.

7. A candy merchant bought 72 bars of Baker's chocolate at 24 cents a bar, to use in making candy. What did it cost?

8. What is the cost of 175 pounds of stick candy at 18 cents a pound?

Here is a picture of some shrubs and flowers planted by some school children.

1. Find the cost of the following: 24 plants of hydrangea at 25 cents each, and 18 of purple barberry at 35 cents.

2. Find the cost of 18 plants of syringa at 38 cents each and 9 spirea at 43 cents each.

3. How many plants are needed to plant a hedge 450 feet long, if a plant is needed every 3 feet?

4. How many plants will it take for an aster garden of 15 rows and 18 plants in a row?

5. From a little pansy bed, Mary picked 24 pansies each morning for 3 weeks. How many did she pick in all?

6. If geraniums cost 6 cents each, what will a bed of 75 cost?

7. Mary needs 36 rosebushes for a rose garden. How much will they cost at 15 cents each?

8. How much will 18 rosebushes cost at 35 cents each?

1. Mary and her father planted 296 tulip, 649 crocus, 214 hyacinth, and 492 narcissus bulbs in one bed. How many bulbs in all?

2. In another bed they planted 16 rows of tulip bulbs, with 18 bulbs in each row. How many bulbs in the bed?

3. John has a little truck garden. He set out 34 rows of lettuce with 49 plants in a row. How many plants did he set out?

4. He tied up 18 bunches of radishes to sell, with 24 in each bunch. How many radishes did it take?

5. He tied up 48 bunches of young onions to sell, with 12 in each bunch. How many onions did it take?

6. By spraying melons the yield is increased 98 baskets to the acre. At 75 cents a basket, what is the gain from spraying an acre?

7. What is the value of an acre of celery yielding 1296 dozen stalks at 28 cents a dozen?

8. If a storm moves eastward across the country at a speed of 38 miles an hour, how far will it travel in 36 hours?

1. What is a merchant?

2. A merchant buys flour at $5 a barrel and sells it for $5.25. How much does he gain on each barrel?

3. To gain one dollar he would have to sell —— barrels.

4. If Harry buys bananas for 15 cents a dozen, and sells them at 2 cents each, how much does he make on every dozen?

5. A dealer bought coal at $4.75 a ton, and sold it for $5.50. What did he gain on the ton?

6. If you should buy a knife for 37¢ and sell it for a half-dollar, what would you gain?

7. Charles's father bought him a bicycle for $37. After 6 months it was sold for $34.50. What was lost?

8. A peddler bought a bunch of 108 bananas for $1, and sold them at 20 cents a dozen. He gained ——.

9. When a grocer buys pepper for 11 cents a pound and sells it for 16 cents a pound, he makes —— cents on every pound, or —— cents on 10 pounds.

10. If I gain 10 cents on every book I sell, to gain 80 cents I must sell —— books.

11. I bought a ball for $1, and sold it for 75¢. I lost ——.

12. A farmer bought a horse for $95. He traded his horse for a motorcycle and sold the machine for $120. He gained —— dollars.

13. A provision dealer buys meat at wholesale for 12 cents a pound, and retails it at 16 cents. How much does he gain on 12 pounds?

1. In making apple jelly, 4 quarts of water should be put upon 8 quarts of apples. After cooking, 3 quarts of juice will drain from this. How many pints of juice is 3 quarts?
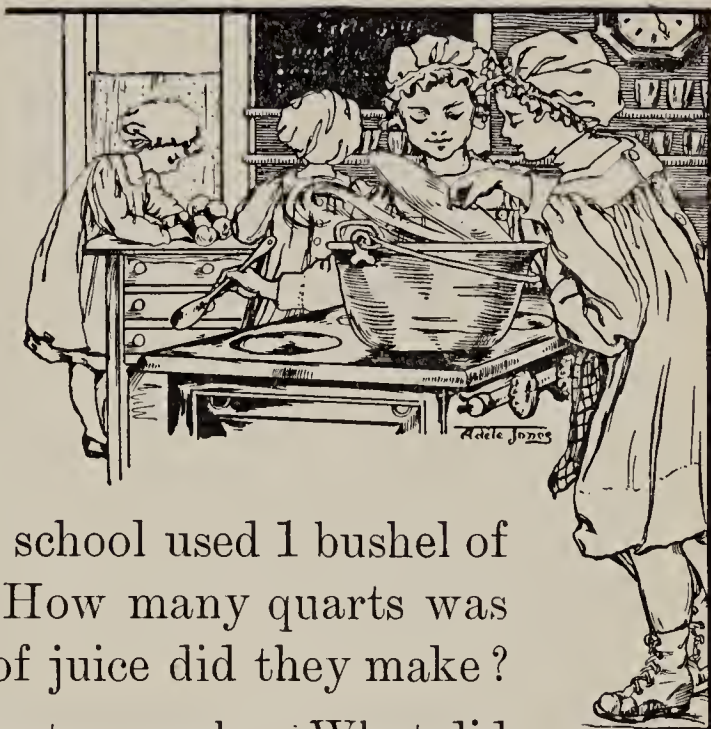
2. A class in cooking at school used 1 bushel of apples in making jelly. How many quarts was that? How many pints of juice did they make?

3. The apples cost 45 cents a peck. What did the apples for this juice cost?

4. To each pint of juice 1 pound of sugar was added. How many pounds of sugar were required? How much did the sugar cost at 6 cents a pound?

5. They found that a pound of sugar added to a pint of juice made a pint of jelly. How many pints of jelly did they get in all?

6. They put the jelly into glasses of which it took 2 to hold a pint. How many glasses did it take?

7. The jelly glasses cost 18 cents a dozen. How much did all of the jelly glasses cost?

8. How many jelly glasses in 5 dozen? In 6 dozen? In 7 dozen?

9. If it takes 2 glasses to hold a pint of jelly, how many glasses will it take for 2 gallons of jelly?

Find the product of:

1. 46 × 843.

2. 38 × 729.

3. 87 × 394.

4. 46 × 798.

5. 77 × 936.

6. 93 × 827.

7. 59 × 846.

8. 49 × 306.

9. 43 × 643.

10. 37 × 845.

11. 45 × 846.

12. 47 × 268.

13. 97 × 643.

14. 84 × 962.

15. 79 × 796.

16. 97 × 867.

17. If your gas bill is $2.75 per month, what is that per year?

18. If I can earn $90 a month and spend $56, what do I save in a year?

19. What is the cost of 13 lb. of sugar at 6¢ per pound and 5 lb. of coffee at 35¢ per pound?

20. I bought 18 tons of coal for winter, at $6.75 a ton. What did the coal cost?

21. A farmer sold 365 bushels of potatoes at 45¢ and 302 bushels at 54¢. What did he receive for all?

22. A fruit train of 18 cars was loaded with oranges. There were 328 boxes in each car. How many boxes were there in the train load?

23. Find the product of 97 × 897.

1. What will 37 lb. of butter cost at 25¢ a pound?

REMARK. — 25 cents may be written $0.25. In writing cents after $, it is best to place a zero before the point to show that there are no dollars.

Always separate dollars from cents by a **decimal point.**

What will be the cost of:

2. 37 gal. oil at $0.19 ?   **5.** 64 yd. carpet at $0.97 ?

3. 48 bu. oats at $0.59 ?   **6.** 75 lb. tea at $0.63 ?

4. 59 yd. silk at $0.87 ?   **7.** 89 lb. coffee at $0.55 ?

8. Find the cost of 36 pounds of coffee at 36 cents a pound, and 58 pounds of sugar at 6 cents a pound.

9. If I divide $37.50 equally among 5 boys, how much does each boy receive ?

10. I earn $1500 a year; my expenses are $950. How much can I save in 10 years?

11. I went to town with $17.62 in my purse; I spent $10.11. How much was left ?

12. Tom received a $20 bill for a birthday present. He bought a football for $4.75 and a saddle for $13.60. How much had he left ?

13. A boy has a paper route with 56 customers. The paper is 45¢ per month. He collected $24.30 one month. How much is there yet to collect ?

14. If a buggy costs $65, and a pony twice as much, how much do both cost ?

1. If to send a telegram costs 45¢ for the first 10 words and 3¢ for each additional word, what is the cost of a telegram containing 19 words?

2. Find the cost of sending a telegram of 58 words at 60¢ for the first 10 words and 4¢ for each additional word.

3. Find the cost of sending a 49-word message at the rate in Problem 2.

4. Write a telegram containing between 10 and 20 words. Find the cost at the rate in Problem 2.

5. When Sumner Ford opened the bank that his father gave him for a birthday present, he found that it contained $6.10. There were 3 half-dollars, 6 quarters, 14 dimes, 17 nickels, and a certain number of pennies. How many pennies were there?

6. If you can buy 3 bananas for 5¢, how much will a dozen cost?

7. Henry had a pair of new skates that cost $2.25. James gave him $1.50 and a new jackknife for the skates. How much was the knife worth?

8. What will be the total cost of the following articles?

    1 clothes wringer $4.75
    1 glass washboard 0.65
  25 cakes of soap at 3¢ a cake

9. The postage on books is 1¢ for each 2 ounces. How much is the postage on a book that weighs a pound?

MOORE, FERGUSON & COMPANY
1728 WALNUT ST.
PHILADELPHIA

NAME	Mrs. Butler		
RESIDENCE	5351 Southport Ave.		

DATE	DEPARTMENT	CLERK NO.	AMOUNT RECEIVED
9/17/10	8	47	10 00

QUANTITY	ARTICLES	PRICE	AMOUNT
2	yd. Velvet Ribbon	45	90
8	yd. Lawn	35	2 80
10	yd. Gingham	15	1 50
	18203–14	PAID SEPT. 17 M. F. & CO.	

This is a memorandum of a customer's purchases, called a **sales check**. In a large department store it is customary to give such a check with the purchases made in each department of the store.

1. In the above check, who was the purchaser? Name the quantities of articles purchased, and the price per yard of each.

2. What was the cost of all of the goods bought? How much money was given the clerk? How much change was received?

In the problems below the symbol @ means *at*. For example, " 3 yd. ribbon @ 15¢ $0.45 " means that 3 yd. ribbon at 15¢ per yard cost 45¢.

In each of the following problems are given the purchases on a sales check. Find the total amount of each.

1. 6 spools thread @ $0.05.
   8 yd. gingham @ 0.20.
   4 yd. muslin @ 0.12.

2. 10 yd. silk @ $1.25.
   6 yd. cambric @ 0.15.
   2 yd. ribbon @ 0.35.

3. 4 yd. canvas @ $0.10.
   7 yd. linen @ 0.55.
   3 skeins floss @ 0.04.

4. 9 yd. lace @ 6¢.
   3 sticks braid @ 8¢.
   8 spools silk @ 10¢.

5. 4 lb. rice @ 12¢.
   5 lb. sugar @ 6¢.
   1 lb. coffee @ 30¢.

6. 2 bbl. flour @ $4.25.
   9 lb. bacon @ 0.28.
   5 lb. lard @ 0.18.

7. 7 yd. braid @ $0.14.
   2 doz. buttons @ 0.18.
   9 yd. gingham @ 0.42.

8. 3 lb. steak @ $0.24.
   4 lb. chicken @ 0.22.
   8 lb. bacon @ 0.26.

9. 2 lb. tea @ $0.65.
   4 bu. potatoes @ 0.85.
   6 cans corn @ 0.15.

10. 9 lb. sausage @ $0.12.
    5 lb. lard @ 0.16.
    3 lb. ham @ 0.30.

NOTE. — The game of *playing department store* by the pupils will be found interesting and furnish much valuable drill. Some of the pupils act as clerks in a department store, and the rest act as purchasers. Each clerk may have a card showing what kind of goods he has for sale. Clerks prepare slips of paper as sales checks. Each purchaser gets a sales check of the first clerk visited, and has the total computed by the last clerk visited. Purchasers check the computation of the clerk.

If one buys goods at a store, and does not pay cash for each purchase, but "runs an account," the store usually sends each month a *statement of indebtedness* called a **bill**.

The bill contains, (1) *a list of articles purchased*, (2) *the dates of the purchases*, (3) *the price, quantity, and cost of each article*, and (4) *the whole cost.*

When a bill is paid, it is **receipted.** That is, the one receiving the payment writes below it " Paid " or " Received payment," and signs his name.

			BOSTON, Dec. 1, 1910					
Mr. E. F. Brown								
		Bought of WALLACE & COLE						
		DEALERS IN STAPLE AND FANCY GROCERIES						
Nov.	5	½ bu. potatoes	@ $0.80			40		
		12 lb. sugar	@ .06			72	1	12
	12	2 lb. tea	@ .48			96		
		3 lb. butter	@ .32			96	1	92
	24	3 cans soup	@ .18					54
							3	58

Rec'd payment,
Wallace & Cole,
By Jones.

1. When were the goods purchased? Who was the buyer? The seller? Give the price and amount of each purchase. Is the bill correct? Has the bill been paid? By whom was it receipted? Why should one keep a receipted bill?

Rule paper and write a bill for each of the following groups, using any dates, and any names you choose for buyer and seller. Receipt each as if you were the seller or his clerk.

1. 23 lb. coffee @ $0.35
   6 lb. tea   @   0.50
   7 lb. lard   @   0.14

2. 16 yd. gingham @ $0.42
   4 doz. buttons @   0.16
   12 yd. braid   @   0.14

3. 6 lb. butter   @ $0.32
   3 cans peas   @   0.14
   2 pk. potatoes @   0.23
   2 pineapples   @   0.14

4. 3 doz. oranges @ $0.35
   4 grape fruit   @   0.16
   4 doz. bananas @   0.20
   6 lb. grapes   @   0.08

5. 5 plows   @ $16.
   7 drills   @   32.
   5 wagons @   83.

6. 23 hogs   @ $ 9
   16 cows   @   42
   63 sheep @   7

7. 78 lb. codfish   @   6¢
   56 lb. halibut   @   18¢
   2 bbl. herring @ $3.75

8. 5 gal. alcohol   @ $2.32
   8 gal. ammonia @   0.16
   7 lb. camphor   @   0.48

9. 84 qt. milk at 8¢; 18 pt. cream at 16¢; 3 lb. butter at 36¢; 2 lb. cheese at 18¢.

10. 10 yd. white goods at 22¢; 3 yd. ribbon at 12¢; 4 yd. braid at 8¢; 6 spools of thread at 5¢.

11. 2 doz. roses at 70¢; 6 doz. carnations at 60¢; 4 doz. tulip bulbs at 65¢; 4 bunches violets at 35¢; 1 doz. roses at 80¢; 1 fern at 75¢.

12. 3 lb. porterhouse steak at 28¢; 5 lb. lard at 18¢; 8 lb. bacon at 28¢; 7 lb. roast at 22¢; 6 lb. fish at 18¢.

1. Divide 382 by 9.

9)382

    42, 4 remaining

Test : $9 \times 42 + 4 = 382$.

9 is contained in 382 forty-two times and 4 remains undivided. Since 9 forty-twos and 4 more make 382, the division is correct.

The number divided is called the **dividend.**

The number by which we divide is called the **divisor.**

The number that shows how many times the dividend contains the divisor is called the **quotient.**

The number left undivided is called the **remainder.**

To test division, see whether the product of the divisor and the quotient, with the remainder added, is equal to the dividend.

Divide and test :

2. $594 \div 8$.

3. $687 \div 7$.

4. $843 \div 9$.

5. $628 \div 9$.

6. $864 \div 5$.

7. $786 \div 8$.

8. $943 \div 7$.

9. $698 \div 6$.

10. $1348 \div 6$.

11. $1765 \div 9$.

12. $3146 \div 7$.

13. $1898 \div 8$.

14. One box holds 6 cakes of soap. How many boxes will be needed for 804 cakes?

15. If there are 9 lozenges in one roll, how many rolls will 711 lozenges make?

1. A man paid $27 for a set of 6 dining-room chairs. How much was that for each chair?

2. Mrs. Scott paid $1.04 for an 8-quart crate of berries. How much was that a quart?

3. At 6 miles an hour, how long will it take a boat to sail 132 miles?

4. A plot of land with a frontage of 360 ft. is divided into 6 equal lots. What is the frontage of each lot?

5. When Mrs. Harris paid her ice bill, she found that she had used 7 cakes. The total weight was 357 pounds. What was the average weight of each cake?

6. When peaches are selling at $2.40 a bushel, how much is that a peck?

7. When a dress pattern of 12 yards is selling for $18, how much is that a yard?

8. When the expenses of a family are $16.80 a week, how much is that a day?

9. Broom bags cost 15 ¢ each. Mary got cloth to make 8 for 72 ¢. What was saved on each by making them? How much was saved on 8?

10. Seven tons of coal cost me $50.40. How much did I pay for a ton?

11. George paid $9.60 for a dozen hens. How much did each one cost him?

12. Charles Ford received $3 for *Saturday Evening Posts*. How many did he sell? The price of one *Post* is 5 cents.

1. Compare 10×8 with 8×10.

2. $10 \times 6 =$ ——; $6 \times 10 =$ ——; 10 6's are ——; 6 10's are ——.

3. $\frac{1}{10}$ of 80? $\frac{1}{10}$ of 60? $\frac{1}{10}$ of 120? $\frac{1}{10}$ of 100?

4. What is the effect of annexing a zero to 8? Of removing the zero from 80?

5. If annexing a zero to 8 multiplies it by 10, how may you multiply 7 by 10? 9 by 10? 12 by 10?

6. $10 \times 13 =$ ——; $10 \times 15 =$ ——; $10 \times 25 =$ ——.

7. If removing the zero from 80 divides it by 10, how may you divide 90 by 10? 70 by 10? 120 by 10?

8. $\frac{1}{10}$ of 60 is ——; $\frac{1}{10}$ of 110 is ——; $\frac{1}{10}$ of 130 is?

9. 10×23? 10. 10×49? 11. $\frac{1}{10}$ of 230?

12. Compare 6×100 with 100×6? 6×1 hundred $= 6$ hundred, or $6 \times 100 = 600$, then $100 \times 6 =$ ——.

13. To get 600, what do we annex to 6? 600 is how many times 6? By what do we multiply 6 when we annex two zeros?

14. How do you multiply 7 by 100; 8 by 100?

15. If $100 \times 6 = 600$, what is $\frac{1}{100}$ of 600?

16. Removing *two* zeros from 600 gives ——, and is the same as taking $\frac{1}{100}$ of it, or dividing it by ——.

Principles. — 1. *Every zero annexed to a whole number multiplies it by* 10.

2. *Every zero removed from the right of a whole number divides it by* 10.

Multiply :

1.	18 by 10.	5.	5 by 100.	9.	96 by 10.
2.	27 by 10.	6.	25 by 100.	10.	84 by 100.
3.	63 by 10.	7.	32 by 100.	11.	385 by 10.
4.	95 by 10.	8.	76 by 100.	12.	20 by 10.

Divide :

13.	760 by 10.	17.	800 by 100.	21.	920 by 10.
14.	890 by 10.	18.	1200 by 100.	22.	3600 by 100.
15.	420 by 10.	19.	6500 by 100.	23.	750 by 10.
16.	640 by 10.	20.	8700 by 100.	24.	8000 by 10.

25. Compare $200 \times \$4$ with $100 \times 2 \times \$4$.

26. Compare $300 \times \$7$ with $100 \times 3 \times \$7$.

27. What is 400×9? 500×7? 40×9?

Exercises

1. What will 500 tons of hay cost at $17 a ton?

WORK

$17
500
———
$8500

EXPLANATION. — 500 tons will cost $500 \times \$17$. $500 = 100 \times 5$; $500 \times \$17$ is the same as $100 \times 5 \times \$17$. Multiplying $17 by 5, we get $85. We multiply $85 by 100 by annexing two zeros, and get $8500, the cost of 500 tons.

What will be the cost :

2. Of 70 tons of hay at $18 per ton?

3. Of 40 tons of hay at $16 per ton?

4. Of 600 tons of coal at $8 per ton?

5. Of 800 cords of wood at $4.25 per cord?

Give quickly :

1. 10×24.
5. 10×60.
9. 100×15.
13. 100×10.

2. 10×57.
6. 10×40.
10. 100×87.
14. 100×125.

3. 10×965.
7. 10×900.
11. 100×32.
15. 100×468.

4. 10×256.
8. 10×990.
12. 100×40.
16. 100×500.

Give orally :

17. 20×42.
20. 70×61.
23. 200×7.
26. 300×22.

18. 30×21.
21. 20×94.
24. 400×8.
27. 400×81.

19. 40×81.
22. 80×31.
25. 900×2.
28. 800×22.

Multiply :

29. 48 by 60.
34. 36 by 90.
39. 48 by 900.

30. 72 by 80.
35. 724 by 20.
40. 56 by 700.

31. 97 by 40.
36. 865 by 60.
41. 39 by 600.

32. 86 by 50.
37. 64 by 400.
42. 78 by 400.

33. 57 by 70.
38. 96 by 800.
43. 50 by 200.

44. Annexing one 0 to the right of a whole number is the same as multiplying the number by —— .

45. Annexing two 0's to the right of a whole number is the same as —— the number by —— .

46. Describe the two things done in multiplying 8 by 60.

47. Describe the two things done in multiplying 9 by 400.

Find the cost of :

48. 50 pounds of sugar at 6¢ a pound.

49. 30 hundred pounds of ice at 35¢ a hundred pounds.

50. 400 pounds of flour at 4¢ a pound.

51. 200 pounds of butter at 28¢ a pound.

Variety	Legal Weight per Bushel	Amount Sown per Acre
Potatoes	60 lb.	10 bu.
Onion Sets	30 lb.	15 bu.
Oats	32 lb.	90 lb.
Barley	48 lb.	90 lb.
Corn	56 lb.	8 lb.
Timothy Seed	45 lb.	12 lb.

This table gives the legal weights per bushel of certain farm and garden produce (weights are practically the same in all states), and the amount of seed sown per acre of ground.

1. Find the weight of 10 bu. of each thing. Of 40 bu.

2. Find the weight of 100 bu. of each. Of 300 bu.

3. Find the quantity of seed of each kind required to plant or sow 10 acres of ground; 50 acres; 90 acres.

4. Find the quantity of seed of each kind required to plant or sow 100 acres of ground; 400 acres; 600 acres.

5. Some things are bought and sold by the *hundredweight*. A hundredweight equals 100 pounds.

How many pounds in 3 hundredweight of nails? In 15 hundredweight? In 38 hundredweight?

6. A merchant goes to the bank to get small change. How many dimes can he get for $1? For $8?

7. How many pennies can he get for $1? For $5? For $10? For $15?

1. One ounce of radish seed will sow a row of radishes 100 ft. long. How many ounces are required to sow a row 200 ft. long? One 600 ft. long? One 800 ft. long?

2. One ounce of turnip seed will sow a row 100 ft. long. How many ounces are required to sow a row 400 ft. long? One 700 ft. long? One 1000 ft. long?

3. One ounce of beet seed will sow a row 100 ft. long. How many ounces are required to sow a row 300 ft. long? One 1200 ft. long? One 2100 ft. long?

4. One quart of peas will sow a row 100 ft. long. How many quarts are required to sow a row 500 ft. long? One 1600 ft. long? One 2300 ft. long?

5. One quart of corn will plant 200 hills. How many quarts are required to plant 400 hills? 800 hills? 1200 hills? 3200 hills?

6. I have 60 pennies which I wish to exchange at the bank for dimes. How many dimes can I get for them?

7. If you had 140 pennies, how many dimes could you get for them?

8. If you had 240 dimes, how many dollars could you get for them?

9. If you had 400 pennies, how many dollars could you get for them?

10. A bank received one day a shipment of 2850 dimes from the United States Treasury. How many dollars was that? It received also 36,700 pennies. How many dollars was that?

1. How many 10's in 20?   In 30?   In 40?   In 50?

2. $10 \times 25 = $ ——.   Then how many 10's in 250?

3. How many 10's in 120?   In 240?   In 350?

4. $640 = 6$ hundred and 4 tens.   It is also 64 ——.

5. When a number ends in 0, the rest of the number tells how many 10's.   Give the number of 10's in

480,   360,   300,   400,   560,   500.

We can divide a number ending in zero by 10, by merely removing the ——.

6. How many 2's in 4?   How many 20's in 40?

7. How many 3's in 9?   How many 300's in 900?

8. How many 4's in 12?   How many 400's in 1200?

Give the quotients:

9. $80 \div 20$.	13. $360 \div 90$.	17. $600 \div 20$.
10. $600 \div 300$.	14. $7200 \div 800$.	18. $800 \div 20$.
11. $1200 \div 400$.	15. $4800 \div 600$.	19. $900 \div 30$.
12. $2500 \div 500$.	16. $5400 \div 900$.	20. $1200 \div 40$.

Before dividing a number ending in zero by another ending in zero, we may remove both zeros.

Divide:

21. $7290 \div 90$.	26. $1350 \div 30$.	31. $19,620 \div 90$.
22. $5760 \div 80$.	27. $5840 \div 80$.	32. $27,440 \div 80$.
23. $9660 \div 70$.	28. $3680 \div 80$.	33. $49,590 \div 90$.
24. $6570 \div 90$.	29. $5460 \div 70$.	34. $63,200 \div 80$.
25. $7360 \div 80$.	30. $3960 \div 60$.	35. $96,740 \div 70$.

1. Divide by 3000 each of the following: 27,000; 26,500; 28,930.

$3\cancel{000})27\cancel{000}$ $3\cancel{000})26\cancel{500}$ $3\cancel{000})28\cancel{930}$

     9   8; 2500 *rem.*   9; 1930 *rem.*

The numbers cut off from the dividend are a part of the remainder.

Divide by 400:

2. 1600.   5. 1720.   8. 2785.   11. 9600.

3. 4200.   6. 2560.   9. 5674.   12. 9500.

4. 5600.   7. 3810.   10. 2983.   13. 8700.

Divide and check:

14. $3500 \div 500$.   28. $84,000 \div 4000$.

15. $4200 \div 600$.   29. $96,000 \div 4000$.

16. $13,500 \div 500$.   30. $78,300 \div 4000$.

17. $16,400 \div 400$.   31. $73,500 \div 6000$.

18. $65,200 \div 400$.   32. $96,000 \div 5000$.

19. $96,500 \div 500$.   33. $75,000 \div 5000$.

20. $78,400 \div 800$.   34. $83,400 \div 6000$.

21. $9630 \div 300$.   35. $97,380 \div 8000$.

22. $84,600 \div 900$.   36. $43,670 \div 4000$.

23. $73,800 \div 900$.   37. $53,265 \div 5000$.

24. $95,200 \div 700$.   38. $86,340 \div 8000$.

25. $86,100 \div 700$.   39. $75,300 \div 7000$.

26. $76,500 \div 900$.   40. $64,300 \div 6000$.

27. $97,200 \div 600$.   41. $87,565 \div 8000$.

1. Divide 765 by 9.

We think this:

$$\begin{array}{r} 85 \\ \hline 9\overline{)765} \\ \underline{720} = 9 \times 8 \text{ tens} \\ 45 \text{ yet to be divided} \\ \underline{45} = 9 \times 5 \text{ ones} \end{array}$$

We write this:

$$\begin{array}{r} 9\overline{)765} \\ \hline 85 \end{array}$$

Test: $9 \times 85 = 765.$

The longer form is called **long division.** In long division it is more convenient to put the quotient above.

2. Divide 6804 by 21.

WORK

$$\begin{array}{r} 324 \\ \hline 21\overline{)6804} \\ \underline{63} \\ 50 \\ \underline{42} \\ 84 \\ \underline{84} \end{array}$$

EXPLANATION. — We think, 68 hundred ÷ 21 = 3 hundred, and we write 3 above in hundreds' place. Then 21×3 hundred = 63 hundred. Putting this under 68 hundred, we do not need to write the two zeros. We have 5 hundred and 4, or 50 tens and 4, yet undivided. We then think, 50 tens ÷ 21 = 2 tens (writing 2 in tens' place). 21×2 tens = 42 tens. Subtracting, we have 8 tens and 4 yet undivided. Then $84 ÷ 21 = 4$. $21 \times 4 = 84$, so the entire number has been divided.

Test: $21 \times 324 = 6804.$

NOTE. — The teacher should develop the final brief form (as shown in Ex. 2) on the board, asking such questions as will lead the pupils to discover each step. There is no value in having pupils give a so-called explanation of a process. That they can answer your questions, and thus discover the process, is sufficient.

The teacher should also show the pupils that to determine each quotient figure it is necessary to notice only the first figure of the divisor and the first one or two figures of the dividend, as the case requires. In case the first two figures of the divisor are such as 29, 19, 38, etc., we use 3, 2, or 4 for the "first figures of the divisor."

Divide and test :

1. $1323 \div 21.$
2. $1554 \div 21.$
3. $1922 \div 31.$
4. $11,172 \div 21.$
5. $10,571 \div 31.$

6. $2193 \div 51.$
7. $2952 \div 41.$
8. $8235 \div 61.$
9. $9676 \div 41.$
10. $58,563 \div 81.$

11. $4224 \div 32.$
12. $8996 \div 52.$
13. $16,992 \div 72.$
14. $25,584 \div 82.$
15. $30,076 \div 73.$

Divide 897 by 21.

WORK

$$
\begin{array}{r}
42 \\
21)\overline{897} \\
84 \\
\hline
57 \\
42 \\
\hline
15
\end{array}
$$

EXPLANATION. — 89 tens $\div 21 = 4$ tens. Place the 4 tens in *tens' place*, over the 9 *tens*. 21×4 *tens* $= 84$ *tens*. 89 tens $- 84$ tens $= 5$ tens; 5 tens and 7 ones $= 57$. $57 \div 21 = 2$, which is written in the quotient over the 7. $21 \times 2 = 42$. $57 - 42 = 15$. Then the quotient is 42, and the **remainder** is 15.

Test : $21 \times 42 + 15 = 897$.

Divide these numbers by 21; 31; 41; 51; 61; 71; 81; 91 :

16. 849 949 1592 6945 9478
17. 975 643 2436 7391 6492

Divide and test :

18. $7240 \div 50.$
19. $6893 \div 51.$
20. $7294 \div 52.$
21. $8476 \div 53.$

22. $4782 \div 54.$
23. $6943 \div 55.$
24. $7382 \div 56.$
25. $9465 \div 57.$

26. $8476 \div 58.$
27. $9371 \div 59.$
28. $7396 \div 58.$
29. $6984 \div 59.$

The only difficulty in long division is estimating the "quotient figures"; that is, in telling how many times the divisor is contained in each partial dividend. Much practice upon the drill exercises of this page will aid you greatly.

To tell the quotient figure of 193 ÷ 51, think "about 190 divided by about 50," hence 19 ÷ 5.

Tell the quotient at sight, but not the remainder:

	A	B	C	D	E
1.	185 ÷ 51	385 ÷ 72	565 ÷ 71	436 ÷ 71	558 ÷ 61
2.	375 ÷ 71	196 ÷ 31	734 ÷ 91	453 ÷ 62	718 ÷ 82
3.	684 ÷ 82	275 ÷ 82	852 ÷ 92	756 ÷ 82	665 ÷ 81
4.	756 ÷ 91	356 ÷ 63	385 ÷ 42	395 ÷ 92	497 ÷ 62

5. Divide 362 by 91.

NOTE. — In this case it is necessary to make a further observation after 36 ÷ 9. While 36 ÷ 9 = 4, the next number of the dividend is not as much as 4 times the next number in the divisor. Hence the quotient figure is 3.

	F	G	H	I	J
6.	181 ÷ 93	645 ÷ 81	725 ÷ 81	356 ÷ 72	283 ÷ 92
7.	273 ÷ 31	728 ÷ 92	725 ÷ 92	361 ÷ 73	372 ÷ 92
8.	245 ÷ 82	567 ÷ 82	456 ÷ 52	324 ÷ 82	367 ÷ 72
9.	365 ÷ 93	549 ÷ 62	426 ÷ 71	334 ÷ 82	431 ÷ 61
10.	365 ÷ 89	482 ÷ 79	243 ÷ 59	637 ÷ 89	812 ÷ 89
11.	426 ÷ 69	565 ÷ 69	365 ÷ 39	635 ÷ 69	640 ÷ 79
12.	725 ÷ 89	246 ÷ 59	245 ÷ 79	560 ÷ 79	540 ÷ 59
13.	562 ÷ 79	543 ÷ 89	456 ÷ 89	182 ÷ 59	492 ÷ 69

Start with any number, in any column, as your teacher directs. Work by columns for just 10 minutes. Score 10 for each correct answer. Keep a record of your scores for several days.

	A	B	C	D	E	F	G	H	
1.	1525	2196	2745	3233	2867	3843	3294	3965	
2.	5185	2806	3477	5063	5795	4636	5673	4453	÷ 61
3.	4514	5246	4087	5124	4575	5734	3904	5917	
4.	2556	1775	3195	3337	4483	3763	4615	3834	
5.	5254	6035	5964	6106	4757	6745	5325	6603	÷ 71
6.	3266	4544	5893	4047	6887	5396	6674	5183	
7.	2025	2916	3645	4293	3807	4374	5103	5265	
8.	6885	5994	6966	5427	6804	7695	6075	7614	÷ 81
9.	3726	6156	7857	5184	4617	7723	7533	5913	
10.	4186	5824	5187	7553	6916	8827	6825	8663	
11.	3276	2275	4095	4277	5733	4823	5915	4914	÷ 91
12.	6734	7735	6097	7826	7644	8645	6643	8554	
13.	2714	4484	5723	3776	4897	3363	4425	5487	
14.	1475	2124	2655	3127	2773	3726	3186	3835	÷ 59
15.	5015	4366	5074	4956	3953	5605	4307	5546	
16.	3174	5106	6693	5244	4416	3933	6417	5037	
17.	5865	4623	5934	5796	6555	5727	5175	6486	÷ 69
18.	2484	1725	3105	3243	3657	4347	4485	3726	
19.	1975	2844	3555	4187	3713	4266	4987	5135	
20.	5846	6715	5293	6794	6636	7505	5925	7426	÷ 79
21.	3634	4503	6257	7663	6004	5767	5056	7347	

NOTE. — These quotients are much more easily found than those in tables II and III.

	A	B	C	D	E	F	G	H	
1.	2511	1829	2108	3038	1302	1488	1922	2232	
2.	1581	2139	2821	1519	2759	1209	2542	2852	÷ 31
3.	2449	1612	2418	1798	1271	1891	2201	1457	
4.	3731	3321	2091	2788	2132	1968	1722	2952	
5.	3239	2419	2829	3198	4018	2009	2542	3772	÷ 41
6.	1927	2911	1681	2378	3649	1599	3362	2501	
7.	4029	3978	4131	2601	3468	2652	4539	4692	
8.	2499	3009	4641	3519	2142	4998	2958	3111	÷ 51
9.	2091	3672	2397	4182	3162	2448	1989	3621	
10.	5551	4819	3111	4941	3599	5978	2562	5429	
11.	5002	4758	3782	3538	4209	3172	4148	2379	÷ 61
12.	2501	3721	4392	2928	5612	2989	2867	4331	
13.	2291	2639	1479	1972	2349	1508	2581	2668	
14.	1711	1421	2262	1218	2842	2001	1682	1363	÷ 29
15.	2059	1189	1798	2088	1392	1131	2378	1769	
16.	3081	2552	3042	3549	1989	3159	2028	1833	
17.	2301	1638	2418	1911	3822	2262	2691	3471	÷ 39
18.	2769	3198	1599	1521	1872	2808	2379	3588	
19.	2891	3871	4459	3332	3822	2499	3969	3381	
20.	3528	2401	3038	4802	2548	2058	4361	2303	÷ 49
21.	4018	1911	2009	2352	2984	2842	3479	4508	
22.	5369	3658	4012	3481	4661	4071	3009	4779	
23.	2301	4602	2478	5782	3068	2891	5251	4189	÷ 59
24.	4248	2773	3422	2419	4838	3599	2832	5428	

NOTE. — This table is to be used like the one on the preceding page, but the quotients are more difficult to determine.

	A	B	C	D	E	F	G	H	
1.	2988	3024	2268	3492	2628	1944	972	2412	
2.	2664	1656	1908	3096	1368	2736	2304	3132	÷ 36
3.	3348	3456	1296	1692	2052	1332	1008	1548	
4.	2898	4278	3864	4462	3082	2484	3358	1242	
5.	2438	3818	2116	3956	4002	3496	1748	2944	÷ 46
6.	1656	3404	4416	2162	1978	1702	2622	1288	
7.	4704	3528	5208	3752	4088	5432	1512	3024	
8.	2576	2968	4648	4872	2128	4816	3584	4256	÷ 56
9.	5376	2016	4144	2408	3192	2632	1568	2072	
10.	4788	7068	5544	4104	2052	5548	7372	5092	
11.	4028	6308	3496	5776	4864	2888	6536	6612	÷ 76
12.	2736	5624	7296	2812	2128	4332	3572	3268	
13.	2016	1512	1232	1608	2328	1296	1752	648	
14.	1104	1272	1776	2088	2064	1824	912	1536	÷ 24
15.	2304	864	1992	1032	1128	888	1368	672	
16.	5076	5952	4032	3456	4608	4288	1728	4672	
17.	2944	4736	3392	4864	5504	5568	4096	2434	÷ 64
18.	6144	5312	2304	2368	3008	2752	1792	3648	
19.	4536	5292	7056	6216	5628	6132	8148	2268	
20.	6384	4452	3864	6972	7308	3192	7224	5376	÷ 84
21.	3108	3024	8064	7812	3612	4788	3948	2352	
22.	4122	7896	8742	6298	9118	5076	6862	2538	
23.	4982	4324	7802	8178	8094	7144	3572	6016	÷ 94
24.	3384	9024	6956	4042	4418	3478	5358	2632	

NOTE. — This table is to be used like those on the preceding pages, but the quotients are more difficult to determine.

1. Divide 8008 by 26.

WORK

```
     308
26)8008
     78
    ———
    208
    208
    ———
```

REMARK.—The partial dividend 20 is smaller than the divisor 26. So we put 0 in the quotient, annex 8 to the 20, and say 26 in 208, 8 times.

Test: $26 \times 308 = 8008.$

2. $3469 \div 62.$	**9.** $8976 \div 92.$	**16.** $550,112 \div 84.$
3. $8328 \div 73.$	**10.** $3481 \div 83.$	**17.** $404,201 \div 74.$
4. $5964 \div 82.$	**11.** $5766 \div 74.$	**18.** $40,121 \div 35.$
5. $42,022 \div 43.$	**12.** $303,211 \div 73.$	**19.** $443,121 \div 44.$
6. $42,202 \div 53.$	**13.** $311,121 \div 83.$	**20.** $13,496 \div 75.$
7. $42,200 \div 73.$	**14.** $342,221 \div 94.$	**21.** $73,942 \div 65.$
8. $40,220 \div 43.$	**15.** $221,121 \div 103.$	**22.** $96,847 \div 44.$

23. Divide 14,246 by 29.

WORK

```
      491
29)14246
   116
   ———
    264
    261
    ———
     36
     29
     ——
      7, remainder.
```

REMARK. — Since the divisor is so near 30, we use 3 to find the quotient figure and think *"nearly 3"* in 14; *"nearly 3"* in 26, etc.

Test: $29 \times 491 + 7 = 14,246.$

24. $46,446 \div 19.$

25. $86,466 \div 29.$

26. $24,246 \div 39.$

27. $86,644 \div 49.$

28. $64,246 \div 59.$

29. $51,535 \div 69.$

30. $35,353 \div 79.$	**32.** $31,533 \div 99.$	**34.** $96,548 \div 98.$
31. $33,353 \div 89.$	**33.** $41,263 \div 48.$	**35.** $76,324 \div 76.$

1. $18,639 \div 53$.
2. $28,466 \div 27$.
3. $46,035 \div 58$.
4. $27,321 \div 24$.
5. $31,406 \div 34$.
6. $86,644 \div 47$.
7. $64,246 \div 67$.
8. $31,533 \div 97$.
9. $54,394 \div 43$.
10. $40,095 \div 38$.
11. $13,555 \div 87$.
12. $31,533 \div 58$.
13. $60,803 \div 85$.
14. $94,830 \div 69$.
15. $65,400 \div 57$.
16. $26,068 \div 98$.
17. $96,068 \div 86$.
18. $39,416 \div 32$.
19. $83,472 \div 35$.
20. $69,842 \div 52$.
21. $17,863 \div 21$.
22. $59,831 \div 31$.
23. $57,632 \div 43$.
24. $28,931 \div 51$.
25. $29,364 \div 62$.

26. 67,865 by 49.
27. 70,380 by 69.
28. 58,761 by 59.
29. 81,761 by 59.
30. 36,878 by 39.
31. 28,465 by 97.
32. 46,287 by 77.
33. 26,387 by 83.
34. 96,242 by 78.
35. 36,245 by 95.
36. 46,791 by 85.
37. 28,436 by 73.
38. 78,391 by 68.
39. 72,983 by 48.
40. 72,702 by 89.
41. 57,936 by 98.
42. 89,876 by 25.
43. 47,621 by 36.
44. 56,932 by 81.
45. 64,371 by 46.
46. 98,428 by 57.
47. 86,471 by 64.
48. 94,328 by 91.
49. 46,792 by 87.
50. 83,735 by 72.

1. If a train runs 798 miles in 21 hours, what is the average rate per hour?

2. If a dealer delivers 63,200 pounds of coal in 16 loads, what is the average size of each load?

3. A bushel of shelled corn weighs 56 pounds. How many bushels in a load of 2464 pounds?

4. If a car can haul 38 tons of coal, how many cars will be required to haul 1596 tons?

5. A bushel of onions weighs 57 pounds. How many bushels in a load that weighs 3591 pounds?

6. A family found that the expenses for the month of August were $119.66. What were the average daily expenses of the family?

7. A family found that their expenses for the year were $1378. What were the average expenses for 1 week? How much can this family save each week from a salary of $32 per week? How much in one year?

8. In 4 months a family had used 52 pounds of butter, and they found that the total cost was $16.64. What was the average cost per pound?

9. A dealer charged me $101.50 for 14 tons of coal. How much was that a ton?

10. How many towels 27 inches long can be cut from a bolt of toweling containing 51 yards?

11. Find the cost of each towel if the bolt costs $8.16?

Give the following :

1. $\frac{1}{6}$ of 18.

2. $\frac{1}{12}$ of 24.

3. $\frac{1}{9}$ of 27.

4. $\frac{1}{8}$ of 48.

5. $\frac{1}{12}$ of 72.

6. $\frac{1}{8}$ of 96.

7. $\frac{1}{6}$ of 84.

8. $\frac{1}{16}$ of 80.

9. $\frac{1}{4}$ of 96.

10. $\frac{1}{6}$ of 36.

11. $\frac{1}{8}$ of 72.

12. $\frac{1}{8}$ of 56.

13. $\frac{1}{9}$ of 72.

14. $\frac{1}{12}$ of 60.

15. $\frac{1}{9}$ of 108.

16. At $1.60 a gallon, how much will a quart of oysters cost ?

17. If your mother paid 96¢ for 8 yd. of lace, how much was the price a yard ?

18. At 24¢ a pound, how much will $\frac{1}{2}$ lb. of meat cost ?

19. At 24¢ a pound, how much will $2\frac{1}{2}$ lb. cost ?

$$
\begin{array}{l}
24\cancel{c} \\
\underline{2\frac{1}{2}} \\
48 \quad = 2 \times 24\cancel{c}\text{, the cost of 2 lb.} \\
\underline{12 \quad = \tfrac{1}{2} \text{ of } 24\cancel{c}\text{, the cost of } \tfrac{1}{2} \text{ lb.}} \\
60\cancel{c} = \text{the cost of } 2\frac{1}{2} \text{ lb.}
\end{array}
$$

20. Find the cost of 18 oranges at 36¢ a dozen.

21. Find the cost of $2\frac{1}{4}$ pounds of butter at 32¢ a pound.

22. Find the cost of 24 pounds of sugar at $6\frac{1}{4}$¢ a pound.

23. Find the cost of 12 yd. of lace at $8\frac{1}{3}$¢ a yard.

24. Find the cost of $3\frac{1}{4}$ bushels of potatoes at 48¢ a bushel.

1. I bought a roast for dinner that weighed $5\frac{1}{2}$ lb. How much did it cost at 22¢ a pound?

2. I asked for 2 lb. of 24¢ steak. The piece weighed $2\frac{1}{4}$ lb. How much did it cost?

3. It took $5\frac{1}{2}$ yards of gingham to make Mary a dress. How much did it cost at 16¢ a yard?

4. Alice bought $10\frac{1}{2}$ yd. of cheesecloth at 6¢ a yard, from which she made 9 dusters. How much did each duster cost?

5. At a bargain sale, the dealer deducted $\frac{1}{4}$ of the price of suits. Henry bought a suit that was marked at $12. How much did it cost him? How much did he save?

6. At 32 cents a yard, how much will $4\frac{1}{2}$ yards of damask toweling cost?

7. Find the cost of 4 yards of lace at $12\frac{1}{2}$¢ per yard; 2 yards of long cloth at 14¢ per yard; 2 bolts of tape at 4¢ per bolt; 5 yards of scrim at 15 cents per yard; and 2 spools of thread at 5¢ each. What change should a customer receive if he gives the clerk a $5 bill for these purchases?

8. Make out a *sales check* for the following:

5 yards of burlap at 19 cents a yard; 7 yards of gingham at 8 cents a yard; $5\frac{1}{2}$ yards of muslin at 14 cents a yard; and a package of needles for 5 cents.

9. Make a *sales check* for 16 lb. of sugar at $6\frac{1}{4}$¢ a pound; 12 lb. of corn meal at $6\frac{1}{2}$¢ a pound; and 6 cantaloupes at $8\frac{1}{3}$¢ each.

1. At 24 ¢ per yard, how much will $3\frac{1}{4}$ yards of gingham cost?

2. Mary bought 12 yards of denim at $18\frac{1}{2}$ cents a yard and made 16 skate bags for presents. The thread and tape cost 18 cents. Find the cost of each bag.

3. If a man's total income for a year is $2860, how much is that a week?

4. A car was found to contain 62,944 pounds of shelled corn. How many bushels was that? (A bushel of shelled corn weighs 56 pounds.)

5. One year a boy sold an average of 239 papers a week. At this rate, how many did he sell in a year?

6. The total yearly expenses of a family of 4 were $1728. What was the average expense of each per month?

7. How many school days in 42 weeks?

8. How many hours is one in school if he attends every school day for 42 weeks and remains $5\frac{1}{2}$ hours each day?

9. Along one side of a street 1200 feet long, how many building lots with a frontage of 75 feet each?

10. If the average length of a block along a city street is 432 feet, how far does a boy walk in going 9 blocks? How much more or less than a mile (5280 ft.) is this?

11. A boy found that in 86 days he had worked 2064 problems in arithmetic. This was an average of how many each day?
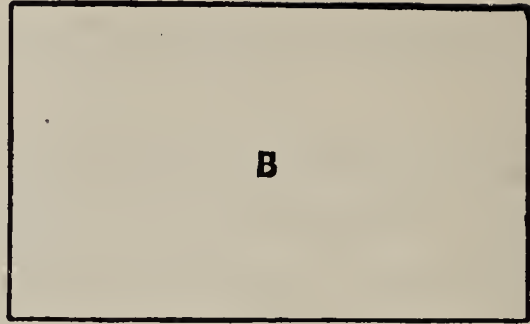
1. We measure **lengths** in *inches, feet,* and *yards.*

2. We measure **surfaces** in *square inches, square feet,* and *square yards.*

3. How many sides has a square? How do the sides compare in length?

4. Show a square on this page. How long is one side?

5. A **square inch** has sides each one inch long.

6. Lines that meet form **angles**. When they meet as the sides of a square, they form **right angles**.

The sides of a square are all equal, and the angles are all right angles.

7. Describe figure B on this page.

A flat surface whose sides are straight lines and whose angles are all right angles is a **rectangle**.

8. Draw a square, making each side 2 inches. How many square inches does it contain?

9. Draw a rectangle 3 inches long and 2 inches wide. How many square inches does it contain?

10. How many square inches in a rectangle 3 inches wide and 4 inches long?

Draw rectangles to represent some of the following :

1. How many square inches will it take to make a rectangle 3 inches wide and 6 inches long? 3 inches wide and 8 inches long?

2. If a rectangle is made from 15 square inches and is 3 inches wide, how long is it? If it is 3 inches wide and contains 18 square inches, how long is it?

3. I have 21 squares an inch long. How long a rectangle can I make if it is to be 3 inches wide?

4. If I have 8 one-inch squares, I can make a rectangle 2 inches wide and 4 inches long, or 1 inch wide and —— inches long.

5. Tell three kinds of rectangles that you can make from 12 one-inch squares.

6. A rectangle 4 inches wide contains 20 square inches. How long is it?

7. A rectangle 8 inches long contains 32 square inches. How wide is it?

8. A square contains 9 square inches. How long is one side?

9. A square contains 16 square inches. How long is one side?

10. Make as many rectangles as you can from 18 one-inch squares.

11. Make as many rectangles as you can from 24 one-inch squares.

12. A rectangle 4 in. by 10 in. contains —— sq. in.

1. How long and wide is your tablet?

2. Can you draw a square 2 inches long on it? One 4 inches long? One 8 inches long?

3. What is the largest square you can draw on it?

When we wish to represent long lines, large squares, and rectangles, we often use a short line to stand for an inch or foot or yard.

A   B   C
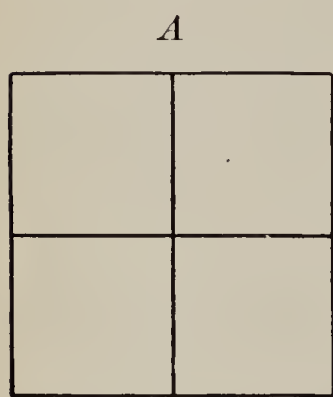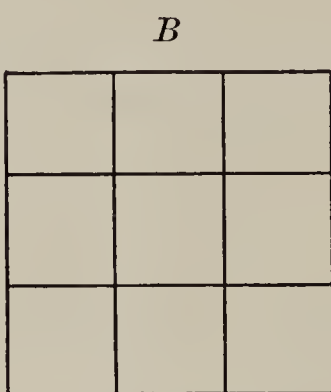
A 2-inch square   A 3-inch square   A 4-inch square
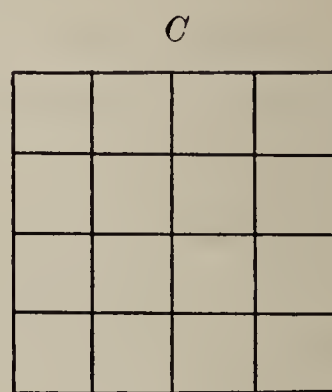
Here are three drawings each 1 inch long, but they stand for squares of different sizes.

A stands for a square 2 inches long, but an inch in the side of the square is only a *half-inch* in the drawing, and so we say it is drawn on a " scale of $\frac{1}{2}$ " or " a half-scale."

B is a picture of a 3-inch square, but an inch in the picture is only *one third* of an inch in the real square. The drawing is on a " $\frac{1}{3}$ scale."

C shows a 4-inch square where a line 4 inches long measures only 1 inch in the picture. One inch is $\frac{1}{4}$ of 4 inches, and so we say the drawing is on " a scale of $\frac{1}{4}$."

4. Draw an 8-inch square on a scale of $\frac{1}{4}$. What is $\frac{1}{4}$ of 8? How long will your picture be?

5. Draw a rectangle 4 inches long and 2 inches wide on a scale of $\frac{1}{4}$.

6. Here is a drawing of the floor of a schoolroom. An inch in the drawing shows 20 feet in the room. How long and wide is the room?
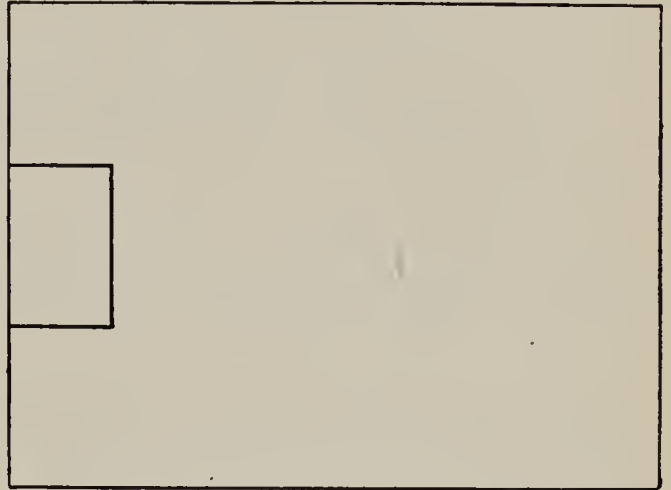
7. On a map, two cities are 4 inches apart. If the map is drawn "200 miles to the inch," how far is one city from the other?

8. Draw a rectangle whose length is 12 inches and whose width is 8 inches, on a scale of $\frac{1}{4}$.

9. Make a drawing like the one in Ex. 6 in which 1 inch will represent 40 feet.

10. A table top is 2 feet square. Let 1 foot be represented by 1 inch in a "$\frac{1}{2}$ scale" drawing.

11. Draw the same table top to a "$\frac{1}{4}$ scale."

12. Draw a pattern for an iron holder 6 inches by 12 inches on a "$\frac{1}{2}$ scale."

13. Draw the same pattern on a "$\frac{1}{3}$ scale."

14. Make a drawing of your desk top on any scale you choose.

1. Draw a line 1 foot long on the blackboard. Draw one on your tablet 1 inch long. If we let the line on the tablet represent the one on the blackboard, 1 *inch represents* 1 *foot.* How long a line on your tablet will represent 1 yard on the blackboard?

2. If you let 1 inch represent 1 yard, what will represent 3 yards?

3. If you let $\frac{1}{2}$ inch represent 1 foot, what will represent 2 feet? What will represent 3 feet? 4 feet?

4. If you let 1 inch represent 1 yard, how many inches will represent the length of your schoolroom? What will represent the width of your schoolroom?

5. Draw a pattern for a box 3 feet long, 2 feet wide, and 1 foot deep, representing 1 foot by 1 inch.

6. Make a drawing to represent the floor of your schoolroom, representing 1 yard by 1 inch. (Do not count parts of a yard.)

7. Represent the blackboards of your schoolroom, using 1 inch for 1 yard.

8. A drawing is 3 inches long and 2 inches wide. If an inch represents 3 feet, how large is the rug that the drawing represents?

9. Helen makes a drawing of her flower bed, which is 12 feet long and 8 feet wide. What will be the size of her drawing if $\frac{1}{2}$ inch represents a foot?

1. Build a 4-inch square from 1-inch squares. How many square inches in a row? How many rows? How many square inches in all?
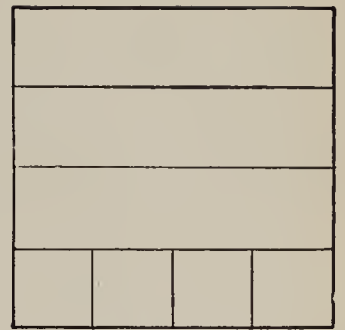
2. Draw a 5-inch square to the scale of $\frac{1}{4}$; that is, let $\frac{1}{4}$ inch represent an inch. Divide it into rectangles 1 inch wide and 5 inches long. How many square inches in each rectangle? How many rectangles? A 5-inch square contains —— sq. in.

Scale $\frac{1}{4}$

3. Can we draw an 8-inch square on this page? Why? Below we have drawn an 8-inch square on "a scale of $\frac{1}{8}$."

8 in.

8 in.
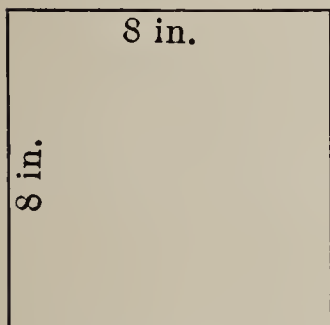
Scale $\frac{1}{8}$
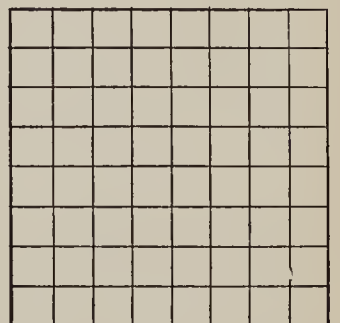
4. To find the number of square inches in an 8-inch square, *first* find the number of rectangles 1 inch wide and 8 inches long. How many? *Then* find the number of square inches in each rectangle. How many?

Then an 8-inch square contains 8×8 sq. in. or —— sq. in.

Draw these rectangles on a $\frac{1}{4}$ scale, and find the number of square inches in each:

5. 12 in. long and 5 in. wide. **6.** 10 in. long and 7 in. wide.

1. Draw a rectangle 4 feet wide and 12 feet long to a scale of 1 inch to 1 foot. Mark it off into squares representing square feet.

How many squares in a row along the side?

How many such rows? Then how many square feet in the rectangle?

The rectangle contains 4 × 12 square feet, or 48 square feet.

Tell how many, drawing rectangles to illustrate:

2. 3 × 4 square inches = —— square inches.

3. 6 × 5 sq. in. = ?   7. 8 × 11 sq. in. = ?
4. 7 × 8 sq. ft. = ?   8. 9 × 10 sq. in. = ?
5. 7 × 10 sq. ft. = ?   9. 6 × 12 sq. in. = ?
6. 9 × 12 sq. in. = ?   10. 5 × 11 sq. ft. = ?

11. If a man owns a building lot 72 feet wide and 154 feet long, how many square feet does it contain?

12. If the building lot upon which you live is rectangular, find its width and length, then find how many square feet it contains.

13. Using 1 inch to represent 10 feet, draw to a scale a map of a building lot 60 feet wide and 150 feet long. How many square feet does it contain?

14. Let 1 inch represent 12 feet. Draw the floor of a room 24 ft. by 36 ft.

15. How long and wide will your drawing be if 1 inch represents 6 feet?
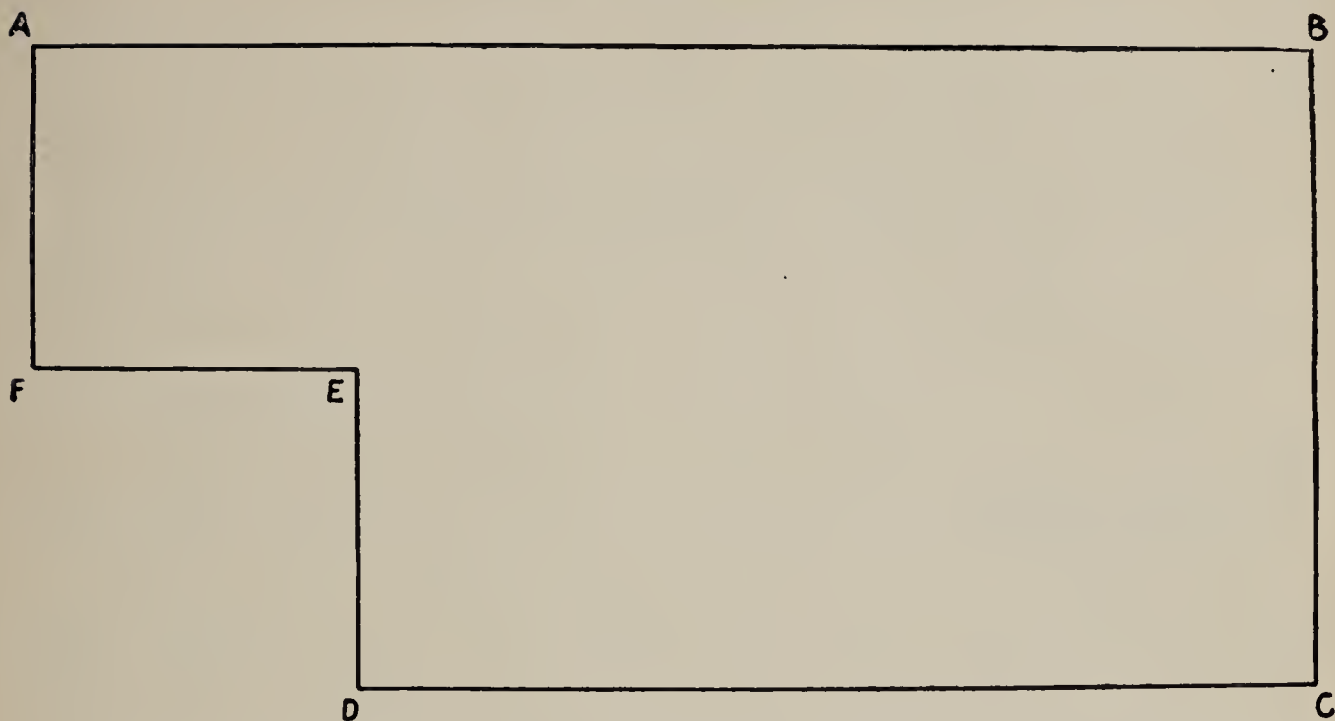
This is the plan of a house in which 1 inch represents 10 feet.

1. With your ruler, measure each of the lines. How many inches is AB? BC? DC? DE? FE? AF?

2. How many feet long is the side AB of the house?

3. How many feet wide is the end BC of the house?

4. How many feet does DC represent? DE? FE? AF?

5. Draw a plan of your schoolroom, letting a line 1 in. long represent 10 ft.

6. If a house were 40 ft. wide and 60 ft. long, and in the plan of it 10 ft. were represented by 1 in., how wide would the plan be? How long?

7. On a map of the United States in which a distance of 100 miles is represented by 1 inch, Cleveland and Chicago are 3 in. apart. How many miles is it from Chicago to Cleveland?
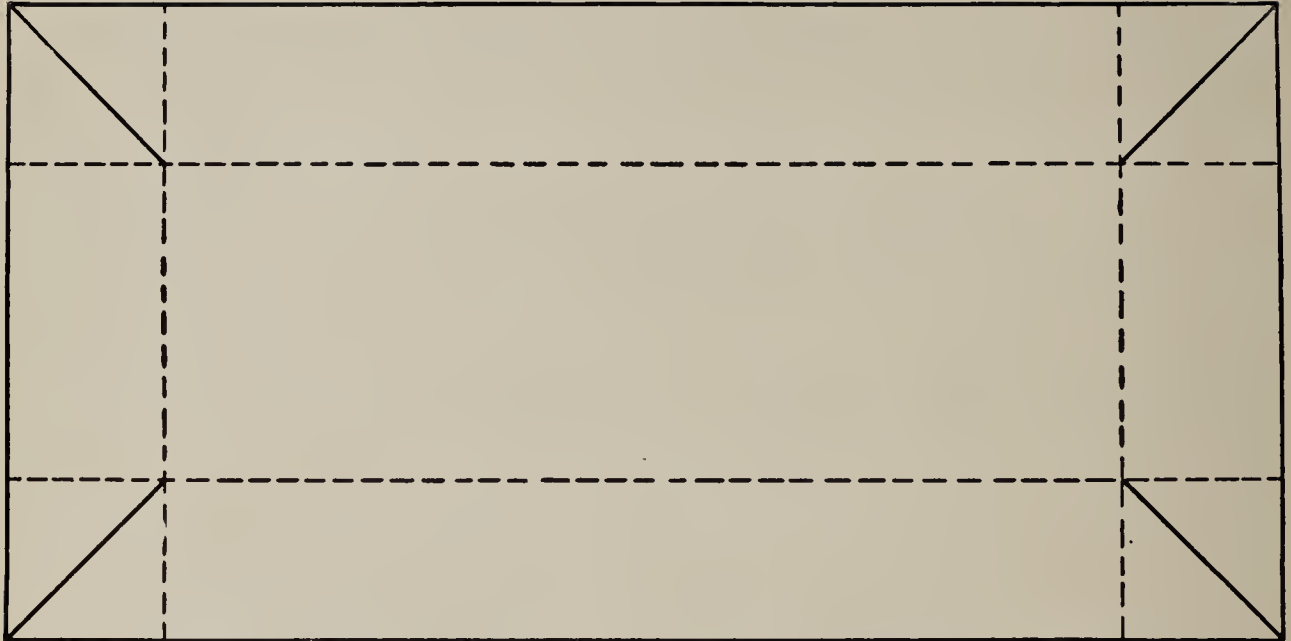
1. This is a pattern for a box without a cover. How long is it? How wide is it? How many square inches of paper does it take?

2. Draw such a pattern. Cut along heavy lines. Fold along dotted lines. How long, how wide, and how deep is the box?

3. Draw a pattern for a box 3 inches long, 2 inches wide, and 1 inch deep. How long is the pattern? How wide is it? How many square inches of paper did it take to make the box?

4. How many square inches of paper are needed to make a box 5 inches long, 3 inches wide, and 1 inch deep?

5. A box is 4 inches square and 1 inch deep. What is the shape and the length of the pattern?

6. Make the drawing for a box 6 inches long, 2 inches wide, and 2 inches deep. Make the box.

1. Mary has a little garden 8 feet wide and 12 feet long. How much wire netting will she need to inclose it?

2. A doll house is 9″ × 12″. How long a picture molding will it take to go around the room?

NOTE. — 9″ means 9 inches. 9″ × 12″ means 9 inches by 12 inches.

3. Alice is painting a border design to go around a 12″ × 18″ box. How many feet will it take?
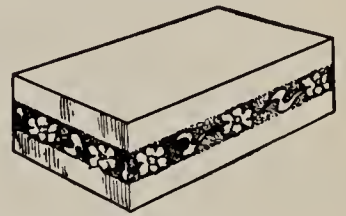
4. A doll house has a window 4″ × 7″. The window frame is made of narrow strips of paper. How many inches will it take?

5. A book bag is 11″ × 14″. Both sides have a border as shown in the picture. How many inches of border must be bought?

6. To make some sheets for a doll's bed, a girl bought muslin 36 inches wide. How many 6″ × 9″ sheets can she make from 1 yard?

7. How many 9″ × 12″ sheets can be made from 1 yard of 36″ sheeting?

8. If it takes a 5″ square to make a stamp box, how many can be cut from a sheet of cover paper 25″ × 40″?

9. How many rectangles for trays 8″ × 11″ can be cut from a sheet of manila board 22″ × 24″?

10. To make a filing envelope requires a piece of paper 5″ × 8″. How many can be made from a sheet of manila paper 40″ × 48″?

1. Find the number of square inches in a 12-inch square.

2. What other name may we give to a 12-inch square?

3. Cut a piece of paper a foot square and ·divide the surface of one side into square inches.   How many?

A square foot contains 144 square inches.

4. On the blackboard draw a 3-foot square.

5. What other name may we give it?

6. Divide it into rectangles 1 foot by 3 feet.   How many rectangles?   How many square feet in each? Then how many square feet in a square yard?

3 feet

12 in.

12 in.

36 inches

1 yard

Scale $\frac{1}{24}$.   One square yard
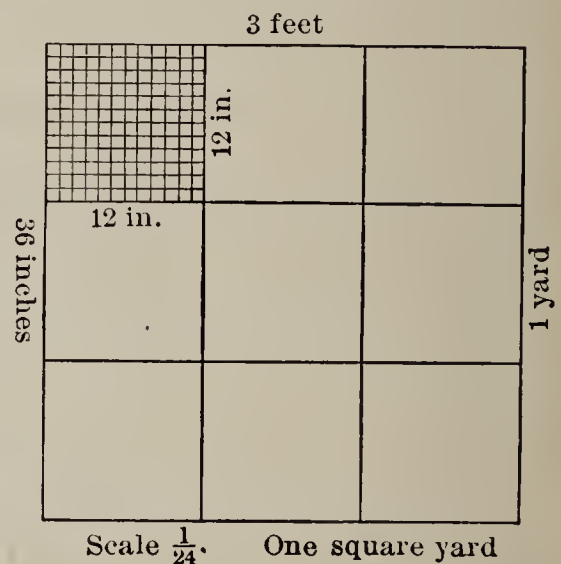
A square yard contains 9 square feet.

Draw diagrams and find the areas of rectangles:

7. 12 feet long and 8 feet wide.

8. 16 feet long and 4 feet wide.

9. 9 feet long and 7 feet wide.

10. 15 feet long and 9 feet wide.

11. How many square yards in the ceiling of a room 4 yards wide and 7 yards long?   How many square feet?

12. How many square feet in a wall 15 feet long and 9 feet high?   How many square yards in the wall?

1. How many square inches in 5 square feet? 5×144 sq. in. = —— sq. in.

2. How many square inches in 12 square feet? In 56 square feet?

3. How many square feet in 4 square yards? 4×9 sq. ft. = —— sq. ft.

4. How many square feet in 20 square yards? In 36 square yards?

5. How many square yards in 36 square feet? 36 sq. ft. ÷ 9 sq. ft. = —— ?

6. How many square yards in 90 square feet? In 135 square feet?

7. A bathroom is 7 feet wide and 9 feet long. How many tiles, each 1 inch square, are required to cover the floor?

8. A railway platform is 4 yards wide and 65 yards long. How many tiles, each 1 foot square, are required to pave it?

9. A blackboard is 4 feet high and 18 feet long. What does it cost to have the surface refinished at 16 cents a square yard?

10. A man has a cement walk built 6 feet wide and 42 feet long. What does it cost him at 25 cents a square foot?

11. A wall between two rooms is 12 feet high and 30 feet long. What does it cost to have it plastered on both sides at 84 cents a square yard?

1. How many square inches of ticking will be needed to make the top and bottom of a 5″ by 8″ mattress for a doll's bed?

2. If it takes a piece of denim 6″ by 8″ to make a marble-bag, how many square inches is that?

3. A doll's bed is 7 inches wide and 10 inches long. The sheets for it are 3 inches longer and 2 inches wider than the bed. How many square inches in each sheet? In 6 sheets?

4. A calendar pad contains 12 sheets of paper 4″ by 7″. How many square inches of paper were used in the pad?
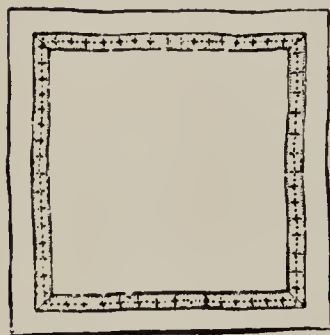
5. Alice planned to make a table cover one yard square, with an ornamental band stitched on three inches from the edge. How much banding must she buy?

6. Nine girls each wove a small rug 12″ by 7½″. These were sewed together, as shown in the picture, to make a large rug. How long and how wide was the large rug?
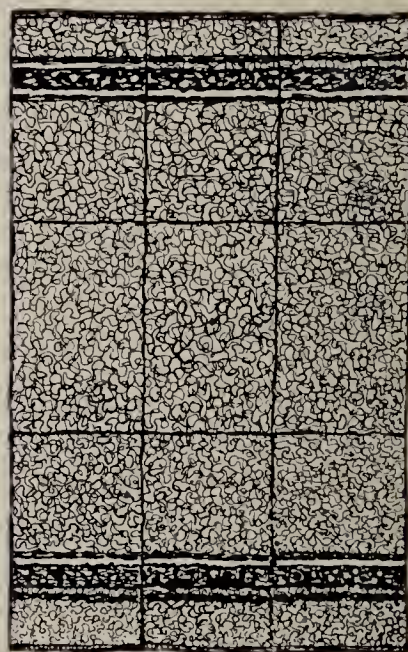
7. In a dolls' hospital are ten beds. How many square inches of muslin are needed for a pair of sheets for each bed, if each sheet is 12 inches by 7½ inches? How many square inches for the sheets of all the beds?

1. This drawing represents a piece of land that can be divided into two rectangles. 200′ means 200 feet. Divide the drawing into two rectangles. How long and how wide is each? Find the area of each rectangle, or the number of square feet it contains.
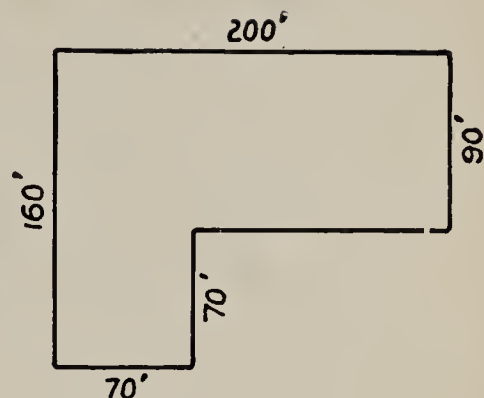
How many square feet in the whole piece of land?

2. A man's building lot is 80 feet wide and 100 feet long. On it are a house 40 feet by 38 feet, and a garden 24 feet by 42 feet. How much remains for lawn?
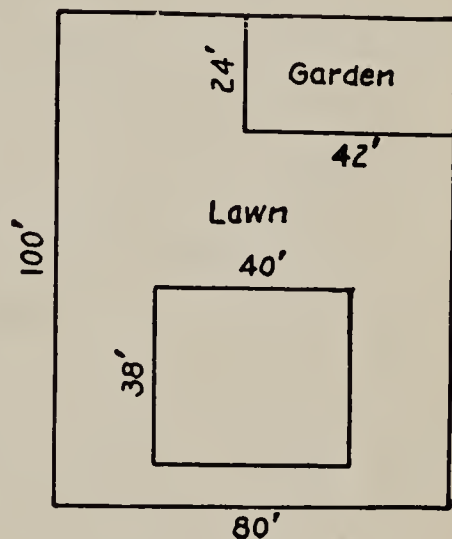
3. A man has a lawn 25 feet wide and 60 feet long. How many square feet does it contain? How much does it cost to have it sodded at 10 cents a square foot?

4. A man has a cement sidewalk made in front of his house. It is 48 feet long and 5 feet wide. How many square feet of it are there? He pays 25 cents a square foot to have it made. What does it cost him?

5. Measure the length and height of each blackboard in the schoolroom, to the nearest foot. Find the total number of square feet that the boards contain. What would they cost at 25 cents a square foot?

1. Short distances are measured in —— and ——.
Longer distances are measured in **yards, rods,** and **miles.**

3 feet (ft.)	= **1 yard** (yd.)
5½ yards	= **1 rod** (rd.)
320 rods	= **1 mile** (mi.)

2. Draw a line one rod long on the blackboard or the floor.

3. Cut a piece of strong cord exactly 1 rod long.   Use it to measure distances in rods.

4. Find in rods the width and the length of the school ground.

5. Find the length of a city block in rods.

6. Guess how many rods it is to some object.   Then measure the distance and see how nearly you guessed it. Repeat this with many objects until you can guess a distance in rods accurately.

7. How many feet in 4 yards ?   In 10 yards ?

8. How many rods in 2 miles ?   In 5 miles ?

9. Find how many feet there are in a rod. $5\frac{1}{2} \times 3$ ft.
= —— ft. $5\frac{1}{2} \times 3$ ft. is 5×3 ft. and $\frac{1}{2}$ of 3 ft., or ——
ft. and —— ft.

10. How many yards in 2 rods ?   In 8 rods ?   In 10 rods ?

11. Mr. Barnes has a field 80 rods square.   How far must one walk to go around the field ?

The distance around a rectangle, or the sum of its sides, is its **perimeter**.

1. Draw a square inch. How long is each side? What is the sum of the sides, or the perimeter of the square?

2. Draw a 6-inch square. What is its perimeter?

3. If a block is 458 feet square, how many feet do you go in walking around it?

4. A picture is 5 inches wide and 8 inches long. How much tape does it take to passe-partout it?

5. My trunk is 3 ft. long, 2 ft. wide, and 2 ft. high. How much rope does it take to go around it once the long way and once the short way, allowing 1 ft. for tying?

6. A room is 15 ft. wide and 18 ft. long. How many feet of picture molding does it take to go around it? How many yards?

7. How many yards of border are used in papering a room 14 ft. by 19 ft.? What does it cost at 18 cents a yard?

8. A farmer has a field 84 yd. wide and 100 yd. long. How much does it cost to build a fence around it at 18 ¢ a foot?

9. How many feet of wire does it take to build a 6-wire fence around a lot 27 yd. wide and 35 yd. long?

10. Mary has a pillow 22 inches square. She wishes to put a pillow cord around the edge. How many inches of cord must she buy? It is 2 yards and how many inches?
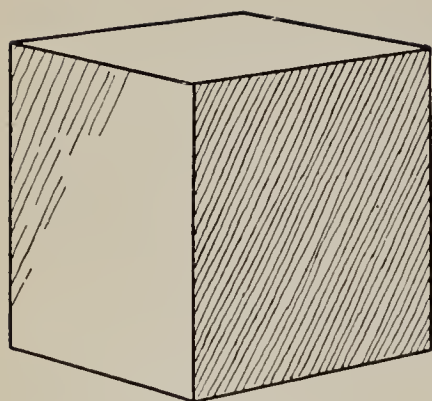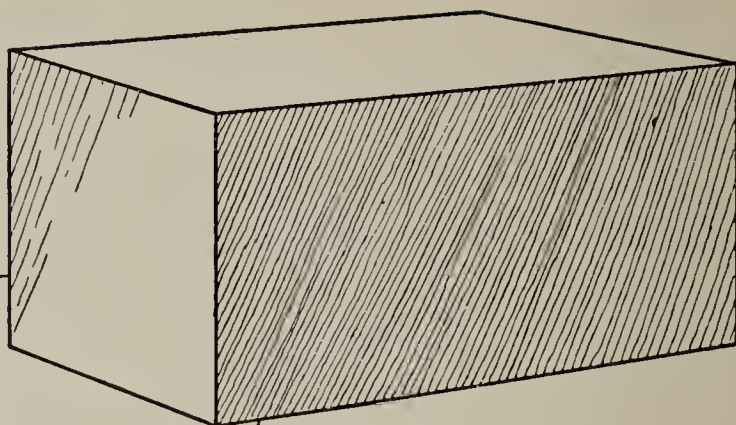
A cube   A prism

1. A cube has *six faces* and each one is a *square*. If each face is a square inch, the cube is called a **cubic inch,** or a one-inch cube.

2. Put 2 one-inch cubes together and you have a **prism.** Give the dimensions of each face of such a prism.

3. Place two prisms made from 2 one-inch cubes together. How many cubic inches are there? What are the dimensions of the second prism?

4. $\frac{1}{2}$ of a prism 2 inches long, 2 inches wide, and 1 inch thick is how many cubic inches? $\frac{1}{4}$ of the prism is how many cubic inches?

5. Make a prism of 3 one-inch cubes. Place two such prisms together. How many cubic inches in all? What are the dimensions of the second prism?

6. Build a 2-inch cube from one-inch cubes. How many one-inch cubes in the bottom layer? How many such layers? How many cubic inches in all?

NOTE. — For this work the pupils should have one-inch cubes. These may be obtained from dealers in kindergarten supplies.
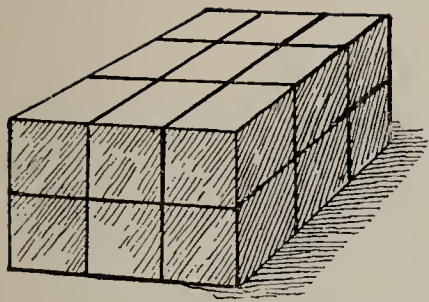
1. How many cubes in one row of the first layer of the prism here represented?

2. How many such rows? Then how many cubes in the upper layer? 3×3 cubic inches = ———.

3. How many such layers in the whole prism? Then how many cubes in the whole prism? 2×9 cubic inches = ———.

4. From 1-inch cubes make a prism 3 inches wide, 1 inch deep, and 6 inches long. How many cubic inches did it take?

5. How many one-inch cubes will it take to make a layer 3 inches wide and 8 inches long? How many in 3 such layers?

6. If I place 24 one-inch cubes in a layer 4 inches wide, how long is it?

7. It takes 42 one-inch cubes to fill my pencil box. How deep is it if the bottom layer is 3 inches wide, and 7 inches long?

8. How many 1-foot cubes will fill a box 2 feet deep, 2 feet wide, and 6 feet long?

9. How many cubic inches in a prism 5 inches wide, 3 inches thick, and 10 inches long?

10. How many one-inch cubes will you need to build a prism 6 inches long, 4 inches wide, and 10 inches high?

1. How many faces has a cube? What is the shape of each?

2. How many faces has the solid here shown? What is the shape of each?
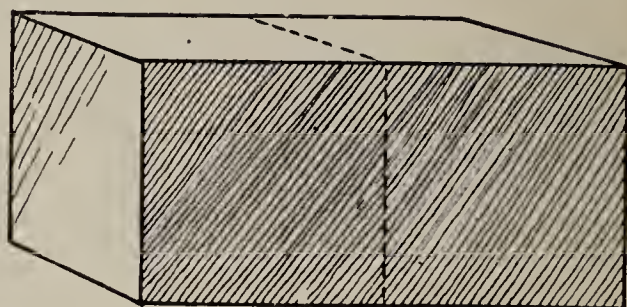
3. It has square corners. How many are there?

A solid whose faces are all rectangles is a **rectangular solid.**

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4. How many cubic inches in a rectangular solid 5 inches wide, 8 inches long, and 4 inches deep?

5. How many cubic inches in a box 7 inches wide, 10 inches long, and 6 inches deep?

6. Make from cardboard a box that will hold 8 cubic inches.

7. Make a plan for a box that will hold 12 cubic inches if it is to be 2 inches high. Make the box.

8. Draw a plan and make a 3-inch cube. What is the area of its surface? How many 1-inch cubes will it contain? Make a box that will hold 24 inch-cubes.
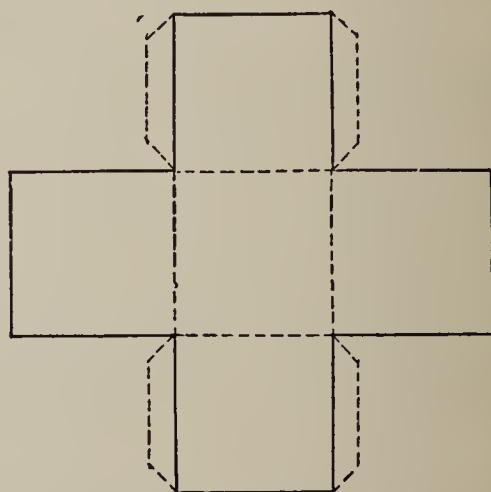
Scale $\frac{1}{6}$

9. How many cubes can you put in one layer in this box? How many layers?

1. How many cubic inches in a solid 3 inches wide, 12 inches long, and 4 inches high?

2. How many cubic feet in a solid 5 feet wide, 6 feet long, and 3 feet high?

The number of cubic inches, or cubic feet, etc., in a solid is its **volume.**

3. Give orally the volumes of rectangular solids as follows:

One 1 in. high, 2 in. wide, 3 in. long.
One 2 in. high, 5 in. wide, 6 in. long.
One 3 in. high, 2 in. wide, 7 in. long.
One 2 ft. high, 4 ft. wide, 5 ft. long.
One 4 ft. high, 6 ft. wide, 10 ft. long.

4. A lunch box is 4 in. deep, 4 in. wide, and 7 in. long. How many cubic inches in its volume?

5. How many cubic inches in a red brick 2 in. thick, 4 in. wide, and 8 in. long?

6. A flour bin is 2 ft. wide, 4 ft. long, and 3 ft. deep. How many cubic feet does it hold?

7. How many cubic feet in a block of marble 1 ft. thick, 3 ft. wide, and 6 ft. high?

8. A farmer has a corn crib 12 ft. wide, 18 ft. long, and 10 ft. high. How many cubic feet does it hold?

9. How many cubic feet does a wagon bed hold that is 2 ft. deep, 4 ft. wide, and 12 ft. long?

1. A ditch is dug 3 ft. wide, 5 ft. deep, and 80 ft. long. How many cubic feet of earth are removed?

2. A cellar is dug 5 ft. deep, 24 ft. wide, and 36 ft. long. How many cubic feet of earth are removed?

3. A teamster has a wagon bed 3 ft. wide, 9 ft. long, and 1 ft. deep. How many cubic feet of earth does he haul at a load? How many in a day, if he hauls 12 loads?

4. A freight car is 8 ft. wide, 7 ft. high, and 34 ft. long. How many cubic feet does it hold?

5. A stack of hay 8 ft. wide, 8 ft. long, and 8 ft. high weighs a ton. How many cubic feet is that?

6. Measure your room, and find out how many cubic feet of air it holds.

7. Each person needs 30 cu. ft. of fresh air a minute. This would be a space 2 ft. wide, 3 ft. long, and how high?

8. This is the plan of a building. (15′ means 15 ft.) The excavation for the cellar is to be 5 ft. deep. Find how many cubic feet of earth must be removed.
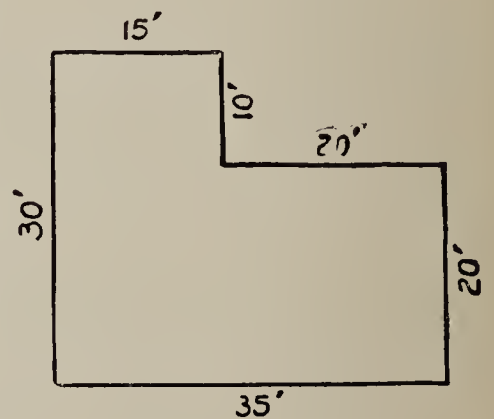
9. This is the plan of the basement of a building for which the excavation is to be 4 ft. deep. Find the number of cubic feet of earth to be removed.
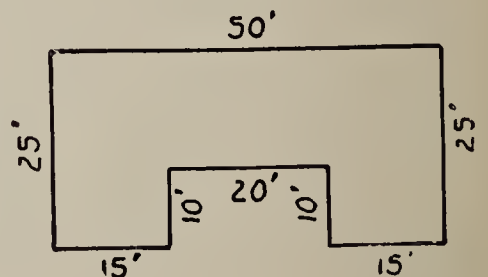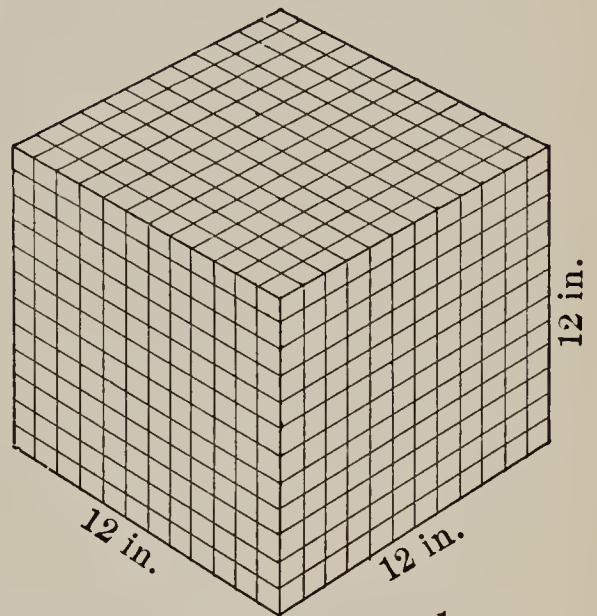
1. How many inches in 1 foot? How many square inches in 1 square foot?

2. How many inches long is a 1-foot cube, or cubic foot? How many inches wide? How many inches high?

3. How many cubic inches in one layer of a 12-inch cube? How many layers? Then how many cubic inches in a **cubic foot**?

1 cubic foot (cu. ft.) = 1728 cubic inches (cu. in.)

A cubic foot (Scale $\frac{1}{12}$)

4. 2 cu. ft. = —— cu. in.

5. 7 cu. ft. = —— cu. in.

6. 25 cu. ft. = —— cu. in.

7. How many cubic inches in 48 cu. ft.?

8. How many cubic inches in $\frac{1}{2}$ cu. ft.? $\frac{1}{3}$ cu. ft.? $\frac{1}{4}$ cu. ft.? $\frac{1}{6}$ cu. ft.? $\frac{1}{8}$ cu. ft.? $\frac{1}{9}$ cu. ft.? $\frac{1}{12}$ cu. ft.?

9. If you forgot the number of cubic inches in 1 cubic foot, how would you reason it out again?

10. How many cubic inches of water in a tank 2 ft. deep, 2 ft. wide, and 3 ft. long?

11. How many cubic inches of wall will 27 bricks make, each 2 in. by 4 in. by 8 in.?

12. How many cubic inches in a steel beam 6 ft. long, 2 ft. high, and $\frac{1}{3}$ ft. wide?

1. How many feet in a yard? How many square feet in a square yard?

2. How many feet long is a 1-yard cube, or cubic yard? How many feet wide? How many feet high?

3. How many cubic feet in one layer of a 3-foot cube? How many layers? Then how many cubic feet in a cubic yard?

Scale $\frac{1}{24}$
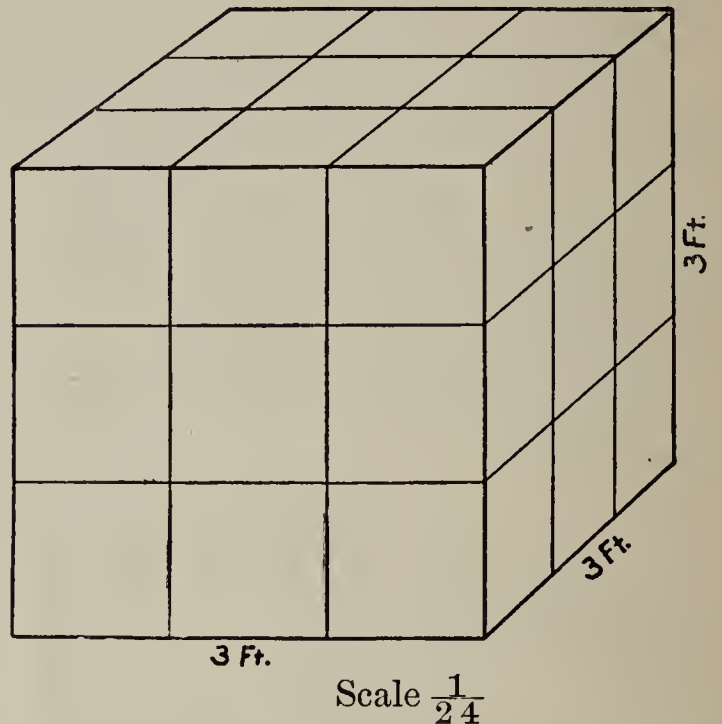
4.   4 cu. yd. = —— cu ft.

5.   16 cu. yd. = —— cu. ft.

6. 180 cu. yd. = —— cu. ft.

1 cubic yard (cu. yd.)
= 27 cubic feet (cu. ft.)

7. How many cubic feet in $\frac{1}{3}$ cu. yd.? In $\frac{1}{9}$ cu. yd.?

8. A cellar is 6 ft. deep, 36 ft. wide, and 45 ft. long. What are the dimensions in yards? How many cubic yards of earth are removed in digging it?

9. This is the plan of the basement of a building. Find the dimensions of the basement in yards. If the basement is 6 ft. deep, how many cubic yards of earth will be removed?
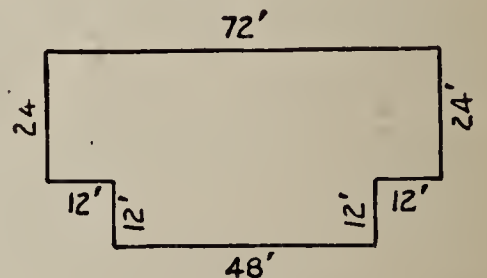
Add:

1. 968	2. 349	3. 861	4. 346	5. 277
731	537	395	587	389
489	683	786	943	196
346	942	428	659	431
742	379	199	853	586
673	165	357	967	297

Subtract:

6. 4265	7. 4138	8. 5203	9. 6340
1893	2519	2835	4536

10. 9103	11. 7306	12. 6039	13. 5013
7624	5187	1854	1831

Multiply:

14. 346	15. 579	16. 843	17. 179	18. 863
27	38	56	49	78

19. 569	20. 734	21. 986	22. 721	23. 846
48	59	37	58	67

Divide:

24. $85{,}643 \div 72.$　　29. $46{,}977 \div 67.$　　34. $75{,}384 \div 76.$

25. $93{,}170 \div 83.$　　30. $81{,}046 \div 88.$　　35. $42{,}850 \div 48.$

26. $46{,}208 \div 91.$　　31. $58{,}960 \div 78.$　　36. $58{,}745 \div 67.$

27. $53{,}205 \div 48.$　　32. $63{,}942 \div 58.$　　37. $49{,}908 \div 98.$

28. $87{,}960 \div 95.$　　33. $80{,}960 \div 59.$　　38. $86{,}101 \div 89.$

(a) *Add each column quickly:* (b) *Add each row quickly:*

	A	B	C	D	E	F	G	H	I	J
1.	1	8	1	8	6	2	7	4	5	6
2.	3	2	2	7	3	6	1	5	6	8
3.	2	9	7	4	1	7	6	4	4	1
4.	8	1	4	2	5	4	3	8	9	7
5.	6	9	8	9	7	3	7	5	2	2
6.	3	5	1	8	5	5	8	6	3	4

(a) *Beginning with the right-hand figure, name the figures of the remainder:* (b) *Add each column:*

	A	B	C
1.	346151 169325	5768216 1986949	6134231 5618419
2.	736143 573826	8645133 1793648	8942150 6894787
3.	638454 439678	4684352 1968967	3457844 1964979

Beginning at the right, name the figures of the product:

	A	B	C	D	E	F
1.	387	946	475	968	547	753
	5	8	7	6	9	8
2.	978	615	368	847	763	381
	3	6	9	4	6	7
3.	762	469	799	925	132	279
	6	5	3	5	6	9
4.	921	789	986	279	219	381
	8	3	7	4	9	4

Divide by each number from 2 to 9 inclusive:

	A	B	C
1.	3465328	5763912	4968345
2.	7346931	4763856	1963845
3.	5648937	5693564	8739645
4.	7869845	5678763	4360962

Find the product of 258 × 346.

WORK

346
258
―――
2768
1730
692
―――
89268

1. Which product is 8 × 346?
2. Which product is 50 × 346?
3. Which product is 200 × 346?
4. Where is the first figure of each partial product placed?
5. What is the sum of all the partial products?

Exercises for Drill

1. 375 × 268.	11. 375 × 683.	21. 693 × 782.
2. 293 × 876.	12. 549 × 678.	22. 318 × 693.
3. 468 × 397.	13. 593 × 876.	23. 846 × 765.
4. 541 × 863.	14. 483 × 597.	24. 349 × 651.
5. 754 × 398.	15. 618 × 392.	25. 843 × 348.
6. 246 × 875.	16. 784 × 569.	26. 967 × 679.
7. 387 × 396.	17. 378 × 689.	27. 863 × 579.
8. 189 × 796.	18. 524 × 676.	28. 835 × 468.
9. 824 × 397.	19. 838 × 297.	29. 349 × 598.
10. 247 × 586.	20. 354 × 978.	30. 547 × 697.

31. A certain firm sold 296 automobiles one year at an average price of $937 each. How much did this firm receive for all?

32. One year a street car conductor collected an average of 286 fares each day he worked. In all he worked 256 days. How many fares did he collect?

1. A manufacturer made 968 boys' suits one year which he sold at $3.85 each. How much did he receive for all?

2. If it takes 128 tiles to each square foot to lay the floor of a bath room, how many must be ordered for the floor of a bath room 12 feet wide and 14 feet long?

3. If a boy works 15 problems each day, 5 days each week, for a school year of 42 weeks, how many is that for the year?

4. A farmer shipped 285 lambs to New York one season and received $2.78 each for them. How much did he receive for all?

5. From an orchard a farmer gathered 285 barrels of apples one year. He sold them for $2.75 a barrel. How much did he have left from the sale after paying 18 ¢ for each barrel and 24 ¢ a barrel for picking?

6. One month a wholesale merchant sold 432 boxes of pencils with 144 pencils in each box. How many pencils was this?

7. A farmer sold 198 crates of peaches one season. If there were 218 peaches in each crate, how many in all?

8. Find the sum of 345 × 698 and 175 × 936.

9. A school used 538 tons of coal one year. Find the cost at $5.65 a ton.

10. If the average expenses in a certain factory are $358 a day, how much are the yearly expenses for 302 working days?

Divide 136,765 by 831.

WORK

164

831)136765

831

5366

4986

3805

3324

481, remainder.

1. What was the first number divided by 831 ?
2. Where was the first quotient figure placed ?
3. Does the work differ from that in which the divisor has but two figures ?

Exercises for Drill

1. $39,416 \div 103$.
2. $83,427 \div 113$.
3. $19,842 \div 105$.
4. $17,863 \div 121$.
5. $19,831 \div 131$.
6. $57,632 \div 143$.
7. $28,931 \div 151$.
8. $73,201 \div 173$.
9. $289,876 \div 125$.
10. $347,621 \div 236$.
11. $456,932 \div 381$.
12. $864,371 \div 426$.
13. $698,428 \div 573$.
14. $386,471 \div 648$.

15. $694,328 \div 901$.
16. $846,792 \div 837$.
17. $345,693 \div 196$.
18. $576,342 \div 913$.
19. $846,357 \div 926$.
20. $943,618 \div 175$.
21. $731,406 \div 315$.
22. $576,963 \div 256$.
23. $841,439 \div 418$.
24. $913,428 \div 706$.
25. $329,832 \div 509$.
26. $665,280 \div 704$.
27. $140,201 \div 893$.
28. $255,565 \div 647$.
29. $561,446 \div 809$.
30. $587,736 \div 907$.
31. $345,144 \div 394$.
32. $430,443 \div 507$.
33. $300,352 \div 608$.
34. $883,666 \div 889$.

2 × 1 = 2	3 × 1 = 3	4 × 1 = 4	5 × 1 = 5
2 × 2 = 4	3 × 2 = 6	4 × 2 = 8	5 × 2 = 10
2 × 3 = 6	3 × 3 = 9	4 × 3 = 12	5 × 3 = 15
2 × 4 = 8	3 × 4 = 12	4 × 4 = 16	5 × 4 = 20
2 × 5 = 10	3 × 5 = 15	4 × 5 = 20	5 × 5 = 25
2 × 6 = 12	3 × 6 = 18	4 × 6 = 24	5 × 6 = 30
2 × 7 = 14	3 × 7 = 21	4 × 7 = 28	5 × 7 = 35
2 × 8 = 16	3 × 8 = 24	4 × 8 = 32	5 × 8 = 40
2 × 9 = 18	3 × 9 = 27	4 × 9 = 36	5 × 9 = 45
2 × 10 = 20	3 × 10 = 30	4 × 10 = 40	5 × 10 = 50
2 × 11 = 22	3 × 11 = 33	4 × 11 = 44	5 × 11 = 55
2 × 12 = 24	3 × 12 = 36	4 × 12 = 48	5 × 12 = 60

6 × 1 = 6	7 × 1 = 7	8 × 1 = 8	9 × 1 = 9
6 × 2 = 12	7 × 2 = 14	8 × 2 = 16	9 × 2 = 18
6 × 3 = 18	7 × 3 = 21	8 × 3 = 24	9 × 3 = 27
6 × 4 = 24	7 × 4 = 28	8 × 4 = 32	9 × 4 = 36
6 × 5 = 30	7 × 5 = 35	8 × 5 = 40	9 × 5 = 45
6 × 6 = 36	7 × 6 = 42	8 × 6 = 48	9 × 6 = 54
6 × 7 = 42	7 × 7 = 49	8 × 7 = 56	9 × 7 = 63
6 × 8 = 48	7 × 8 = 56	8 × 8 = 64	9 × 8 = 72
6 × 9 = 54	7 × 9 = 63	8 × 9 = 72	9 × 9 = 81
6 × 10 = 60	7 × 10 = 70	8 × 10 = 80	9 × 10 = 90
6 × 11 = 66	7 × 11 = 77	8 × 11 = 88	9 × 11 = 99
6 × 12 = 72	7 × 12 = 84	8 × 12 = 96	9 × 12 = 108

10 × 1 = 10	11 × 1 = 11	12 × 1 = 12	ROMAN
10 × 2 = 20	11 × 2 = 22	12 × 2 = 24	NUMERALS
10 × 3 = 30	11 × 3 = 33	12 × 3 = 36	
10 × 4 = 40	11 × 4 = 44	12 × 4 = 48	I = 1
10 × 5 = 50	11 × 5 = 55	12 × 5 = 60	V = 5
10 × 6 = 60	11 × 6 = 66	12 × 6 = 72	X = 10
10 × 7 = 70	11 × 7 = 77	12 × 7 = 84	L = 50
10 × 8 = 80	11 × 8 = 88	12 × 8 = 96	C = 100
10 × 9 = 90	11 × 9 = 99	12 × 9 = 108	D = 500
10 × 10 = 100	11 × 10 = 110	12 × 10 = 120	M = 1000
10 × 11 = 110	11 × 11 = 121	12 × 11 = 132	M = 1000
10 × 12 = 120	11 × 12 = 132	12 × 12 = 144	$\overline{M}$ = 1,000,000

ANSWERS: PRIMARY BOOK

Page 63

1. 67.
2. 58.
3. 79.
4. 59.
5. 95.
6. 96.
7. 69.
8. 98.
9. 88.
10. 88.
11. 79.
12. 48¢.
13. 45¢.
14. 37.
15. 37¢.

Page 64

5. 84; 66; 86; 95; 67; 92; 97; 161; 127; 135.

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7. 72; 92; 81; 43; 55; 125; 123; 132; 184; 174; 676; 847; 679; 384; 494; 536; 552; 621; 565; 454.

Page 66

1. 84.
2. 121.

3. 183.
4. 184.
5. 165.
6. 170.
7. 164.
8. 203.
9. 184.
10. 205.
11. 245.
12. 244.
13. 93.
14. 180.
15. 95.
16. 122.
17. 176.
18. 237.
19. 202.
20. 165.
21. 176.
22. 219.
23. 251.
24. 226.
25. 285.
26. 317.
27. 298.

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7. 3029.
8. 2591.
9. 2571.
10. 2536.
11. 2580.
12. 2437.
13. 2437.
14. 2035.

15. 1765.
16. 1786.
17. 1519.
18. 2236.

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1. 971.
2. 1865.
3. 1789.
4. 1610.
5. 1022.
6. 893.
7. 1696.
8. 1274.
9. 1570.
10. 1688.
11. 1337.
12. 918.
13. 1173.
14. 1249.
15. 1428.
16. 1363.
17. 1279.
18. 1273.
19. 996.
20. 1726.
21. 794.
22. 1100.
23. 1541.
24. 746.
25. 1616.
26. 2150.
27. 1468.
28. 1652.

Page 69

1. 52.
2. 103.
3. 1876 lb.
4. 49.
5. 3314.

Page 73

1. 45.
2. 53.
3. 62.
4. 51.
5. 22.
6. 25.
7. 52.
8. 41.
9. 15.
10. 34.
11. 21.
12. 61.
13. 23.
14. 53.
15. 11.
16. $71.
17. 32¢.

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1. 243; 251; 332; 352; 263.
3. 58.
4. 48.
5. 17.
6. 59.
7. 25.
8. 65.

9. 216.
10. 336.
11. 266.
12. 344.
13. 314.
14. 217.
15. 343.
16. 136.
17. 253.
18. 145.
19. 244.
20. 322.

Page 76

1. $23.
2. $47.
3. 16 in.
4. 179 mi.
5. 91.
6. 184.
7. 391.
8. 451.
9. 181.
10. 182.
11. 192.
12. 513.
13. 198.
14. 306.
15. 111.
16. 467.
17. 192.
18. 2896.
19. 5594.
20. 934.
21. 6148.
22. 624.
23. 1623.
24. 5623.
25. 5504.
26. 7273.

27. 2422.
28. 367.
29. $77.

Page 77

8. 33.
9. 44.
10. 16.
11. 28.
12. 21.
13. 29.
14. 114.
15. 383.
16. 251.
17. 552.
18. 58.
19. 17.
20. 53.
21. 9.
22. 262.
23. 244.
24. 457.
25. 297.

Page 78

1. 17 ¢.
2. 24 ¢; 8 ¢; 16¢; 6 ¢.
3. 23¢; 16¢; 31¢; 8¢.
4. 58¢; 33¢; 11¢; 65¢.
5. 61.
6. 83.
7. 135.
8. 175.
9. 24 yr.
10. 38 lb.
11. 105.
12 72.

Page 79

1. 1517.
2. 2165.
3. 2554.
4. 1606.

Page 80

1. 314.
2. 263.
3. 328.
4. 312.
5. 321.
6. 3281.
7. 2744.
8. 2096.
9. 2102.
10. 2999.
11. 3471.
12. 3034.
13. 121.
14. 743.
15. 185.
16. 189.
17. 742.
18. 1742.
19. 3748.
20. 5348.
21. 2718.
22. 1921.
23. 911.
24. 552.
25. 446.
26. 746.
27. 209.
28. 703.
29. 708.
30. 511.
31. 808.
32. 845.
33. 487.

Page 84

1. 168; 84; 48; 82; 126; 68; 188.
3. 128; 146; 166; 184; 108; 182; 164.
4. 248; 486; 688; 642; 864; 1082; 1284.

Page 85

3. 138; 252; 288; 162; 225; 171; 87; 189; 51.
4. 772; 1722; 1694; 978; 1788; 2295; 2883.
5. $172.
6. 408 bu.
7. 138.

Page 86

5. 84; 168; 244; 304; 348; 372; 228.
6. 312.
7. $3780.

Page 87

1. 136; 192; 528; 1164; 752.
2. 276; 204; 441; 1278; 2904.
3. 248; 312; 1276; 1944; 3316.

13. 79	91	51	68	81	52	89	92
14. 59	49	78	42	98	69	58	47
15. 71	41	62	72	48	39	82	61
16. 79	65 ; 17	78	91	51	81	52	47
17. 59	42	62	49	98	58	69	89
18. 71	82	41	39	48	72	61	92
19. 59	79	91	68	78	51	81	69
20. 72	49	62	98	52	42	89	47
21. 82	39	41	48	60 ; 44	58	71	92
22. 91	62	68	59	79	69	51	81
23. 39	78	42	98	52	49	89	71
24. 72	47	58	41	82	61	48	92

Table III. Page 221

	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
1.	83	84	63	97	73	54	27	67
2.	74	46	53	86	38	76	64	87
3.	93	96	36	47	57	37	28	43
4.	63	93	84	97	67	54	73	27
5.	53	83	46	86	87	76	38	64
6.	36	74	96	47	43	37	57	28
7.	84	63	93	67	73	97	27	54
8.	46	53	83	87	38	86	64	76
9.	96	36	74	43	57	47	28	37
10.	63	93	72 ; 72	54	27	73	97	67
11.	53	83	46	76	64	38	86	87
12.	36	74	96	37	28	57	47	43
13.	84	63	51 ; 8	67	97	54	73	27
14.	46	53	74	87	86	76	38	64
15.	96	36	83	43	47	37	57	28
16.	79 ; 20	93	63	54	72	67	27	73
17.	46	74	53	76	86	87	64	38 ; 2
18.	96	83	36	37	47	43	28	57
19.	54	63	84	74	67	73	97	27
20.	76	53	46	83	87	38	86	64
21.	37	36	96	93	43	57	47	28
22.	43 ; 80	84	93	67	97	54	73	27
23.	53	46	83	87	86 ; 10	76	38	64
24.	36	96	74	43	47	37	57	28

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2. 55 ; 59 rem.
3. 114 ; 6 rem.
4. 72 ; 60 rem.
5. 977 ; 11 rem.
6. 796 ; 14 rem.
7. 578 ; 6 rem.
8. 935 ; 15 rem.
9. 97 ; 52 rem.
10. 41 ; 78 rem.
11. 77 ; 68 rem.
12. 4153 ; 42 rem.
13. 3748 ; 37 rem.
14. 3640 ; 61 rem.
15. 2146 ; 83 rem.
16. 6548 ; 80 rem.
17. 5462 ; 13 rem.
18. 1146 ; 11 rem.
19. 10,070 ; 41 rem.
20. 179 ; 71 rem.
21. 1137 ; 37 rem.
22. 2201 ; 3 rem.
24. 2444 ; 10 rem.
25. 2981 ; 17 rem.
26. 621 ; 27 rem.
27. 1768 ; 12 rem.
28. 1088 ; 54 rem.
29. 746 ; 61 rem.
30. 447 ; 40 rem.
31. 374 ; 67 rem.
32. 318 ; 51 rem.
33. 859 ; 31 rem.
34. 985 ; 18 rem.
35. 1004 ; 20 rem.

Page 223

1. 351 ; 36 rem.
2. 1054 ; 8 rem.
3. 793 ; 41 rem.

4. 1138 ; 9 rem.
5. 923 ; 24 rem.
6. 1843 ; 23 rem.
7. 958 ; 60 rem.
8. 325 ; 8 rem.
9. 1264 ; 42 rem.
10. 1055 ; 5 rem.
11. 155 ; 70 rem.
12. 543 ; 39 rem.
13. 715 ; 28 rem.
14. 1374 ; 24 rem.
15. 1147 ; 21 rem.
16. 266.
17. 1117 ; 6 rem.
18. 1231 ; 24 rem.
19. 2384 ; 32 rem.
20. 1343 ; 6 rem.
21. 850 ; 13 rem.
22. 1930 ; 1 rem.
23. 1340 ; 12 rem.
24. 567 ; 14 rem.
25. 473 ; 38 rem.
26. 1385.
27. 1020.
28. 995 ; 56 rem.
29. 1385 ; 46 rem.
30. 945 ; 23 rem.
31. 293 ; 44 rem.
32. 601 ; 10 rem.
33. 317 ; 76 rem.
34. 1233 ; 68 rem.
35. 381 ; 50 rem.
36. 550 ; 41 rem.
37. 389 ; 39 rem.
38. 1152 ; 55 rem.
39. 1520 ; 23 rem.
40. 816 ; 78 rem.
41. 591 ; 18 rem.
42. 3595 ; 1 rem.
43. 1322 ; 29 rem.

44. 702 ; 70 rem.
45. 1399 ; 17 rem.
46. 1726 ; 46 rem.
47. 1351 ; 7 rem.
48. 1036 ; 52 rem.
49. 537 ; 73 rem.
50. 1162 ; 71 rem.

Page 224

1. 38 mi.
2. 3950 lb.
3. 44 bu.
4. 42.
5. 63 bu.
6. $3.86.
7. $26.50 ; $5.50 ; $286.
8. 32 ¢.
9. $7.25.
10. 68.
11. 12 ¢.

Page 225

16. 40 ¢.
17. 12 ¢.
18. 12 ¢.
19. 60 ¢.
20. 54 ¢.
21. 72 ¢.
22. $1.50.
23. $1.
24. $1.56.

Page 226

1. $1.21.
2. 54 ¢.
3. 88 ¢.
4. 7 ¢.
5. $9 ; $3.
6. $1.44.

7. $1.71 ; $3.29.
8. $2.33.
9. $2.28.

Page 227

1. 78 ¢.
2. 15 ¢.
3. $55.
4. 1124 bu.
5. 12,428.
6. $36.
7. 210.
8. 1155 hr.
9. 16.
10. 3888 ft. ; 1392 ft. less.
11. 24.

Page 234

11. 11,088 sq. ft.
13. 9000 sq. ft.
15. 4″ × 6″.

Page 237

1. 40 ft.
2. 42 in.
3. 5 ft.
4. 22 in.
5. 100 in.
6. 24.
7. 12.
8. 40.
9. 6.
10. 48.

Page 239

1. 720 sq. in.
2. 1728 sq. in. ; 8064 sq in.
3. 36 sq. ft.

4. 180 sq. ft. ; 324 sq. ft.
5. 4 sq. yd.
6. 10 sq. yd. ; 15 sq. yd.
7. 9072.
8. 2340.
9. $1.28.
10. $63.
11. $67.20.

Page 240

1. 80 sq. in.
2. 48 sq. in.
3. 117 sq. in. ; 702 sq. in.
4. 336 sq. in.
5. 120 in.
6. $36'' \times 22\frac{1}{2}''$.
7. 180 sq. in. ; 1800 sq. in.

Page 241

1. 22,900 sq. ft.
2. 5472 sq ft.
3. 1500 sq. ft. ; $150.
4. 240 sq. ft. ; $60.

Page 243

3. 1832 ft.
4. 26 in.
5. 19 ft.
6. 66 ft. ; 22 yd.
7. 22 yd. ; $3.96.
8. $198.72.
9. 2232 ft.
10. 88 in. ; 16 in.

Page 245

5. 24 ; 72.
6. 6 in.
7. 2 in.
8. 24.
9. 150 cu. in.
10. 240.

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1. 144 cu. in.
2. 90 cu. ft.
4. 112 cu. in.
5. 64 cu. in.
6. 24 cu. ft.
7. 18 cu. ft.
8. 2160 cu. ft.
9. 96 cu. ft.

Page 248

1. 1200 cu. ft.
2. 4320 cu. ft.
3. 27 cu. ft. ; 324 cu. ft.
4. 1904 cu. ft.
5. 512 cu. ft.
7. 5 ft.
8. 4250 cu. ft.
9. 4200 cu. ft.

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4. 108 cu. ft.
5. 432 cu. ft.
6. 4860 cu. ft.
7. 9 cu. ft. ; 3 cu. ft.
8. 2 yd. × 12 yd. × 15 yd. ; 360 cu. yd.
9. 512 cu. yd.

Page 251

1. 3949.
2. 3055.
3. 3026.
4. 4355.
5. 2176.
6. 2372.
7. 1619.
8. 2368.
9. 1804.
10. 1479.
11. 2119.
12. 4185.
13. 3182.
14. 9342.
15. 22,002.
16. 47,208.
17. 8771.
18. 67,314.
19. 27,312.
20. 43,306.
21. 36,482.
22. 41,818.
23. 56,682.
24. 1189 ; 35 rem.
25. 1122 ; 44 rem.
26. 507 71 rem.
27. 1108 ; 21 rem.
28. 925 ; 85 rem.
29. 701 ; 10 rem.
30. 920 ; 86 rem.
31. 755 ; 70 rem.
32. 1102 ; 26 rem.
33. 1372 ; 12 rem.
34. 991 ; 68 rem.
35. 892 ; 34 rem.
36. 876 ; 53 rem.
37. 509 ; 26 rem.
38. 967 ; 38 rem.

Page 253

1. A. 1935.
   B. 7568.
   C. 3325.
   D. 5808.
   E. 4923.
   F. 6024.
2. A. 2934.
   B. 3690.
   C. 3312.
   D. 3388.
   E. 4578.
   F. 2667.
3. A. 4572.
   B. 2345.
   C. 2397.
   D. 4625.
   E. 792.
   F. 2511.
4. A. 7368.
   B. 2367.
   C. 6902.
   D. 1116.
   E. 1971.
   F. 1524.
1.
   A.
   1. 1,732,664.
   2. 1,155,109 ; 1 rem.
   3. 866,332.
   4. 693,065 ; 3 rem.
   5. 577,554 ; 4 rem.
   6. 495,046 ; 6 rem.
   7. 433,166.
   8. 385,036 ; 4 rem.

B.
1. 2,881,956.
2. 1,921,304.
3. 1,440,978.
4. 1,152,782 ; 2 rem.
5. 960,652.
6. 823,416.
7. 720,489.
8. 640,434 ; 6 rem.

C.
1. 2,484,172 ; 1 rem.
2. 1,656,115.
3. 1,242,086 ; 1 rem.
4. 993,669.
5. 828,057 ; 3 rem.
6. 709,763 ; 4 rem.
7. 621,043 ; 1 rem.
8. 552,038 ; 3 rem.

2.

A.
1. 3,673,465 ; 1 rem.
2. 2,448,977.
3. 1,836,732 ; 3 rem.
4. 1,469,386 ; 1 rem.
5. 1,224,488 ; 3 rem.
6. 1,049,561 ; 4 rem.

7. 918,366 ; 3 rem.
8. 816,325 ; 6 rem.

B.
1. 2,381,928.
2. 1,587,952.
3. 1,190,964.
4. 952,771 ; 1 rem.
5. 793,976.
6. 680,550 ; 6 rem.
7. 595,482.
8. 529,317 ; 3 rem.

C.
1. 981,922 ; 1 rem.
2. 654,615.
3. 490,961 ; 1 rem.
4. 392,769.
5. 327,307 ; 3 rem.
6. 280,549 ; 2 rem.
7. 245,480 ; 5 rem.
8. 218,205.

3.

A.
1. 2,824,468 ; 1 rem.
2. 1,882,979.
3. 1,412,234 ; 1 rem.
4. 1,129,787 ; 2 rem.

5. 941,489 ; 3 rem.
6. 806,991.
7. 706,117 ; 1 rem.
8. 627,659 ; 6 rem.

B.
1. 2,846,782.
2. 1,897,854 ; 2 rem.
3. 1,423,391.
4. 1,138,712 ; 4 rem.
5. 948,927 ; 2 rem.
6. 813,366 ; 2 rem.
7. 711,695 ; 4 rem.
8. 632,618 ; 2 rem.

C.
1. 4,369,822 ; 1 rem.
2. 2,913,215.
3. 2,184,911 ; 1 rem.
4. 1,747,929.
5. 1,456,607 ; 3 rem.
6. 1,248,520 ; 5 rem.
7. 1,092,455 ; 5 rem.
8. 971,071 ; 6 rem.

4.

A.
1. 3,934,922 ; 1 rem.

2. 2,623,281 ; 2 rem.
3. 1,967,461 ; 1 rem.
4. 1,573,969.
5. 1,311,640 ; 5 rem.
6. 1,124,263 ; 4 rem.
7. 983,730 ; 5 rem.
8. 874,427 ; 2 rem.

B.
1. 2,839,381 ; 1 rem.
2. 1,892,921.
3. 1,419,690 ; 3 rem.
4. 1,135,752 ; 3 rem.
5. 946,460 ; 3 rem.
6. 811,251 ; 6 rem.
7. 709,845 ; 3 rem.
8. 630,973 ; 6 rem.

C.
1. 2,180,481.
2. 1,453,654.
3. 1,090,240 ; 2 rem.
4. 872,192 ; 2 rem.
5. 726,827.
6. 622,994 ; 4 rem.

7. 545,120 ; 2 rem.

8. 484,551 ; 3 rem.

Page 254

1. 100,500.
2. 256,668.
3. 185,796.
4. 466,883.
5. 300,092.
6. 215,250.
7. 153,252.
8. 150,444.
9. 327,128.
10. 144,742.
11. 256,125.
12. 372,222.
13. 519,468.
14. 288,351.
15. 242,256.

16. 446,096.
17. 260,442.
18. 354,224.
19. 248,886.
20. 346,212.
21. 541,926.
22. 220,374.
23. 647,190.
24. 227,199.
25. 293,364.
26. 656,593.
27. 499,677.
28. 390,780.
29. 208,702.
30. 381,259.
31. $277,352.
32. 73,216.

Page 255

1. $3726.80.
2. 21,504.

3. 3150.
4. $792.30.
5. $664.05.
6. 62,208.
7. 43,164.
8. 404,610.
9. $3039.70.
10. $108,116.

Page 256

1. 382 ; 70 rem.
2. 738 ; 33 rem.
3. 188 ; 102 rem.
4. 147 ; 76 rem.
5. 151 ; 50 rem.
6. 403 ; 3 rem.
7. 191 ; 90 rem.
8. 423 ; 22 rem.
9. 2319 ; 1 rem.
10. 1472 ; 229 rem.
11. 1199 ; 113 rem.
12. 2029 ; 17 rem.

13. 1218 ; 514 rem.
14. 596 ; 263 rem.
15. 770 ; 558 rem.
16. 1011 ; 585 rem.
17. 1763 ; 145 rem.
18. 631 ; 239 rem.
19. 913 ; 919 rem.
20. 5392 ; 18 rem.
21. 2321 ; 291 rem.
22. 2253 ; 195 rem.
23. 2013 ; 5 rem.
24. 1293 ; 570 rem.
25. 648.
26. 945.
27. 157.
28. 395.
29. 694.
30. 648.
31. 876.
32. 849.
33. 494.
34. 994.

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