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SCHOOL ARITHMETIC

Primary Book

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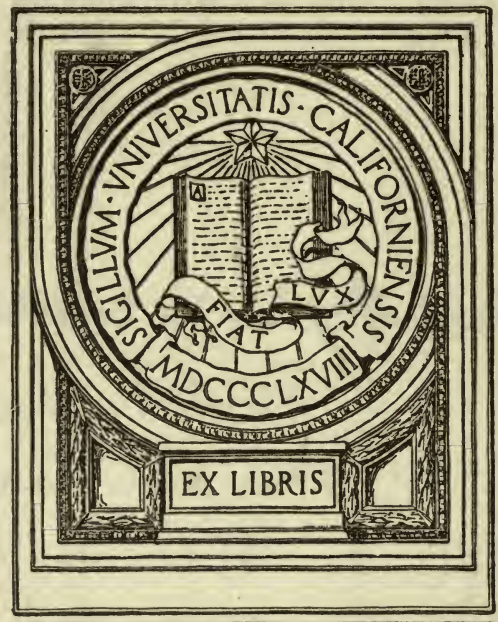

SCHOOL ARITHMETIC

PRIMARY BOOK

BY

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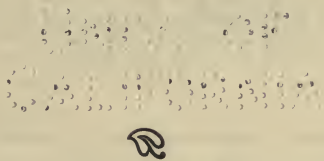

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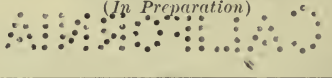

CAJORI

PREFACE.

TO DEVELOP in the pupil's mind the idea of number and its uses, to give him facility in numerical operations, and to lead him to grasp firmly the principles involved requires the serious effort of the most skilful teacher. The most any author can do to aid him is to present, in more or less detail, an outline of a practical scheme of instruction based upon the latest and best thought in number teaching; and even this is a task that none but the superficial would undertake without "fear and trembling." Neither theory nor practice alone is a sufficient endowment for the work. Every theory, every method, every device must be weighed in the class-room balance. That which is to be taught is the child—not arithmetic.

Holding these views, the writers of this book have spared no effort in its preparation. With a wholesome respect for the injunction, "Prove all things; hold fast that which is good," they have endeavored to steer carefully between the Scylla of modern fad and the Charybdis of mechanical drudgery and stupefying monotony. Their aim has been to furnish for the teacher a sound and practical work presenting the matter in an approved order and suggesting rational methods of obtaining the most desirable results. As to how well they have succeeded the teacher must decide.

ARRANGEMENT.—Before entering school the child learns a little of a great many things, not a great deal about one thing. There is no topical arrangement in nature. "And Nature, the dear old nurse," permits the order of the child's mental development to determine the arrangement of the material, which is always a progressive one. The child learns a little about many things to-day, a little more to-morrow, adds an increment to his knowledge and widens his range of subjects day by day. This arrangement keeps interest alive, without which there is no substantial progress. This book aims to follow the natural

order as closely as may be, considering the conditions under which teachers are required to work.

"From the Concrete to the Abstract."—The child's mind must be approached through those ever open doors, the senses. Primary number teaching must be begun by the pupil's observing and handling objects, yet the mere presence of concrete things does not guarantee the presence of definite numerical ideas in the mind of the pupil. They must be so presented as to stimulate and aid the mental movement of discriminating and relating which leads to definite ideas of number. The mind must (*a*) recognize the like objects as distinct individuals, and (*b*) group (put together) the objects into a whole. The child's own activity must conceive *a whole of parts*, and relate the parts in *a definite whole*. It is not enough that he knows our country as 45 states; he must know the 45 states as one country. He should recognize *five*, for example, not only as five *ones*, but also as one *five*, considering the component ones not chiefly for their own sake, but as giving definite value to the *whole*, the *group*. By repeated acts of such measurement or valuation the mind advances naturally and inevitably from things to relations, from facts to principles, from the concrete to the abstract. Believing that the concept of ratio—an abstract idea—must be evolved in the young mind by its own activity, and that therefore it should not be *thrown at* the child in the earlier stages of his progress, the authors have not *explicitly* stated the ratio idea until it has had time to grow into a recognizable and useful product of the pupil's mind.

Material.—The objects called for in this book, such as cubes, splints, foot rules, quart measures, etc., can be provided by the teacher with little trouble, and their use should precede that of pictures and words. How long their use should be continued with any given class must be determined by the teacher. They should certainly not be laid aside until the child can bring their *images* into consciousness without the presentation of the actual objects to his senses; but when these images are within easy reach, their use should supersede that of objects. The number pictures given in this book are an important aid to the child's mental movement of abstracting and relating, and must be used for economy of energy. Five dots analytically arranged () are more easily grasped than five dots placed

promiscuously, or even in a row. Moreover, they are perceived as one whole, rather than as separate, unrelated parts, and they should symbolize any five units whatever—five $2 or five 10-ft. as well as five $1 or five 1-ft. In the perceptive form  , twelve is *seen* as three *fours* and as four *threes*—as *four* three times and as *three* four times—and the child's idea of the number is more definite than when the whole was measured by but one unit, the individual. Besides, this use of pictures suggests to the pupil a method by which he can discover for himself the measuring units of quantity or determine the definite value of a whole. In notation, fractions, measurement of surfaces, etc., the illustrations will be found highly beneficial; their purpose is to aid, not to ornament.

Counting—Measuring.—Dr. Harris says, "The first lessons in arithmetic should be based on the practice of measuring in its varied applications." In its earlier stages measurement is a vague estimate, a crude guess. Later an undefined unit of measure is used to make a whole more definite, as when a class is measured by the unit boy—an unmeasured unit. But it is only when the unit itself is accurately defined that precise numerical value is reached. The immediate purpose of measuring is to make some whole more definite—to find *how much* there is of it. This can be done by learning how many units are in it, and the "how many" can be found only by counting; hence measuring involves rational counting—the finding of the *sum* of the units that compose a whole. It seems clear, therefore, that the child learning to count should be led to number the parts that make up some whole, as the desks in a row—to count with a *definite end in view;* that the starting point should be a group of things—a whole to measure, parts to count and relate. As soon as possible there should also be exact measurements. The foot may be taken as the whole and measured by 4-inch units, 3-inch units, etc. Not only the idea of number as the repetition of a unit of measure to equal a magnitude, but also the law of commutation will be slowly, perhaps, but surely developed through the use of the facts supplied by sense-perception in the rational use of objects and number pictures.

Figure Processes only the Means to an End.—The child must learn figure processes, not for their own sake, but as an aid in discerning relation. Figures are not at all necessary to

numerical perception, but when this is to be supplanted by numerical facility they should be employed as a convenient tool. The real subjects of thought are magnitudes (of value, of space, of weight, etc.) and their relations; figures are mere symbols of these. The essential thing is the discernment of relation by comparing magnitudes; figure processes may or may not be an aid in securing this end—they can never be anything more. It is evident, therefore, that the mere manipulation of figures—the mechanical work—is of small value in comparison with the thought processes—the mental work; yet as the means to an end it is of great importance, and to secure absolute accuracy therein should be the constant aim of every teacher.

Suggestive Questions and Directions.—The exercises of this book are more abundant and varied than is usual in books of this kind, and much additional work will be called forth by the suggestive nature of many of the questions and directions. There is an especial need of an abundance of constructive exercises. The pupil must be *active*, must *do* as well as *see*. *Knowing* and *doing* are correlative. Things are grasped most readily when there is a necessity, real or apparent, for knowing them. Boys who sell papers or fruit on the streets, being under the necessity of computing and making change, enter school with a surprising stock of number facts. Excellent number work may be had in connection with the occupations of the school-room—passing pencils, making boxes, modeling, playing number games, measuring things used in nature study and manual training, etc. The questions and directions given indicate the *kind* of work that should be done, but the quantity of it needed must be determined by the teacher, and by him supplied when necessary. Figures and signs are not used until the child has acquired some familiarity with the names of numbers to twelve and with a few of the simpler processes and facts. This should at least suggest that the figure symbol should not be given until the child can understand that it is a mere mechanical tool by which he can obtain rapid and at the same time equally true results.

It is neither necessary nor desirable to keep this book out of the hands of young pupils until they are able to read it with ease. They should at least get the benefit of the *number pictures* and the *picture exercises*. Anything too difficult for the

children should be read by the teacher, and answers *only* required of the pupils. Formal analysis should be deferred; when insisted upon at too early a stage, it interferes with progress and deadens the pupil's interest.

It is believed that in plan, matter, and method this book is in substantial accord with the views of progressive teachers in the best schools, and that it will prove a suitable foundation for and introduction to the more formal and rigorous treatment presented in the Advanced book of the series. Its contents are such, however, that pupils who can complete only this book will find themselves fitted to cope with the ordinary problems of every-day life.

THE AUTHORS.

July 2, 1900.

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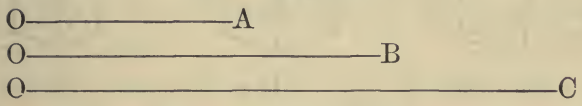
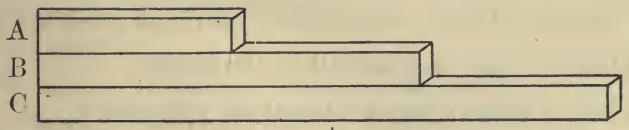
SCHOOL ARITHMETIC.

FIRST STEPS.

Comparison.



1. The line OB is longer than which line?
The line OB is shorter than which line?
The line OA is shorter than which lines?
The line OC is longer than which lines?
Which line is longer than the line OB?
Which lines are shorter than the line OC?
Which line is shorter than the line OB?
Is any one of these lines longer than the line OC?
Is any one shorter than the line OA?



2. Cut splints the same length as A, B, and C.
Show me the longest.
Show me the next longest.

Show me the shortest.

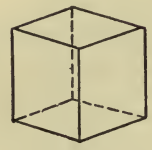
Show me the next shortest.

How many of these splints are longer than B?

How many of these splints are longer than A?

How many of these splints are shorter than B?

How many of these splints are shorter than C?



A

B

C

3. Blocks of this shape are called cubes.

Which is the largest cube?

Which is the next largest cube?

Which is the smallest cube?

Which is the next smallest cube?

How many cubes are larger than C?

How many cubes are smaller than A?

What can you tell me about B?

4 Which is longer, the length of your desk or its width?

Which is wider, the sidewalk or the street?

Which is longer, your arithmetic or your slate?

Which is thicker, your book or your slate?

Which is larger, a boy or a man?

Which is higher, your house or the school-house?

5. Here are two groups of cubes.

Which is the larger group?

How many more cubes in the larger group than in the smaller one?

Which of these rings has the most dots in it?

The ring on the left has how many more dots than the one on the right?

Are there more girls than boys in the class? How many more?

NOTE.—Children should be given sufficient exercise in making comparison to familiarize them with the use of the terms *longer*, *shorter*, *larger*, *smaller*, *higher*, *wider*, etc. They may compare solids, surfaces, lines, sounds, or any objects within reach or sight.

6. Here are pictures of a square, a circle, a triangle, and a sphere.

Show me the square. Show me the circle.

Now show me the triangle. Show me the sphere.

Take four sticks of the same length and make a square.

Cut a square out of paper. Name something that resembles a square in shape.

From pasteboard cut out six equal squares. Make a box of them. What have you? Name some object shaped like a cube.

Lay a penny on paper and draw a line around it.

Cut out the circle. Name something that is a circle in shape.

Draw a square on the blackboard. Now draw a circle.

Did you draw straight lines in making the square? What kind of line around the circle?

Here is a marble. What is it shaped like? Is your ball a sphere? What part of the body is almost a sphere?

NOTE.—Have pupils observe and handle solids until they know the familiar cube, sphere, square, triangle, circle. Have them model simple forms, and cut squares, circles, etc., from paper.

Counting to Twelve.

7. How many boys are in the class? How many girls?

How many seats are in this row?

How many sides has this square?

Count the faces of this cube.

How many pairs of shoes in the class?

How many groups of three blocks?

Here are twelve spools. Arrange them in pairs, and count the number of pairs.

Arrange them in groups of three, and count the groups.

Here are some dots.

How many *twos?* 

How many *threes?* 

How many *fours?* 

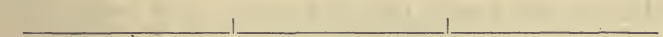
Measuring—Use of Ruler.

8. This line ———————— is an inch long.

Draw a line as long as the one above.

Cut four sticks each as long as the line. How long is each stick?

How many sticks are as long as the line below?



Then how long is this line?

Find how many inches wide this book is.

How long is your pencil?

Draw a line four inches long.

An inch lower, draw another line four inches long.

Rule a page of this paper with lines an inch apart.

9. How long is this square? How wide is it?

Are all four sides of the same length?

A square that is an inch on a side is called a square inch.

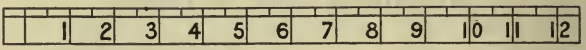
Draw a square inch on paper. Cut it out.

Cut out a piece of paper two inches long and one inch wide.

How many square inches can you make of it?

Draw a square two inches on a side.

Into how many square inches can you cut it?



10. This is a picture of a ruler reduced in size.

Here is a real foot-rule. It is a foot long.

Use the rule to find how long this table is.

How many feet wide is the table?

Measure this line on the blackboard. How long is it?

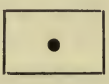
What is the length of this blackboard?

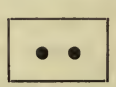
Cut a strip of paper an inch long.

Find how many strips are as long as the foot-rule.

There are twelve inches in a foot.

The Numbers One and Two.





11. How many dots are on the first card?

Hold up one finger. Hold up one more finger.

How many fingers are you holding up?

How many fingers are *one* finger and *one* finger?

Show me two hands. Show me two buttons.

Two boys are how many more than one boy?

Here is a square. □ Make pictures of two squares.

How many stars are ☆ and ☆ ?

How many books are one book and one book?

How many are one and one?

Here are two squares. □□ Push away the one on the right. How many are left?

Make two marks on the board. Rub out one mark. How many are left?

One marble from two marbles leaves how many marbles?

How many more cents are  than  ?

How many cents must be put with one cent to have two cents?

△ and △ are how many triangles?

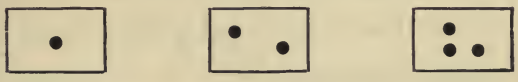
○ and ○ are how many circles?

• from ⁘ leaves how many dots?

□ and —— are □□ ?

How many ones in two?

The Number Three.



12. How many dots are *two* dots and *one* dot?

Make the three dots on the board.

Show me three books. Three fingers.

Say *school* three times.

How many sides has this triangle? △

What number comes before three? Before two?

What number is between one and three?

How many rings are ○ ○ and ○ ?

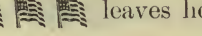
How many stars are ☆ and ☆ ☆ ?

How many cows are two cows and one cow?

I have one cube. Give me enough to make three.

Here are three dots. • • • Cover one dot. How many are not covered?

Cover two dots. How many can you see?

 from  leaves how many flags?

 less are how many tents?

Measure this yardstick with your foot-rule. How long is it?

13. How many *ones* in  ?

How many *twos* in  ?

How many *pairs* of twos in  ?

Show me two *threes*, using splints.

Show me three *twos* with splints.

Make pictures of three groups of stars.

Make pictures of three pairs of tents.

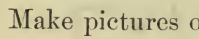
14. Copy and complete:

△ △ and △ are ——.

□ and □□ are ——.

☆☆ and —— are ☆☆☆.

○ ○ ○ less ○ ○ are ——.

 less —— are .

15. Two dogs and one dog are how many dogs?

One foot and two feet are —— feet.

There were three birds on the fence, but one flew away. How many were left?

Mary had three pennies, but now she has only two. How many did she spend?

My hat cost three dollars. I have paid one dollar; how much do I owe?

Tom ate one apple and had two left. How many had he at first?

Charles has three rabbits, and Paul has one less. How many has Paul?

The Number Four.

16. Make a triangle with these three splints.

Now try to make a square with them.

How many more splints do you need?

How many dots are on the card to the right?

How many sides has a square?

How many seasons in the year?

Tell me the names of four boys.

How many letters in the word *four?*

Take two cubes in each hand. How many cubes have you?

How many triangles can you make with these twelve splints?

I have one cube. Give me enough to make four.

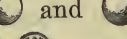
If I give you one, how many will I have left?

Cover two of the dots on the right-hand card. How many can you see?

Show me the number of splints these words stand for: *three, two, four.*

Copy these pictures, and write under each group the *word* for the number (*how many*) in each group:

17. How many tops are  ?

How many marbles are  ?

How many cents are  ?

 leaves how many apples?

 are how many circles?

There are four splints. Give me half of them.

How many have I? How many have you?

This line ———|——— is one inch long.

In one inch there are —— half inches.

This line ———|———|———|——— is two inches long.

In two inches there are —— half inches.

In  there are  (half-circles).

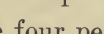
In two circles there are —— half-circles.

18. How many ones in  ? How many *twos?*

Show me four twos with splints.

Make pictures of four pairs of tents.

Here are four tops.  How many boys can have one top each?

Here are four pears.  How many girls can have two pears each?

Cut a strip of paper three inches long.

Find how many strips are as long as your foot-rule.

Cut a strip of paper four inches long and one inch wide.

Find how many square inches will cover it.

Ask your papa how many quarters make a dollar.

Ask your mamma how many quarts in a gallon.

19. Copy and complete, then read:

 and  are ——.

 and  are ——.

 and —— are  .

 less  are ——.

 less  are ——.

 less —— are  .

20. Three boys and one boy are how many boys?

One tree and three trees are how many trees?

Two sheep and two sheep are —— sheep.

Harry had four apples, but gave one to May. How many had he left?

You have four fingers on one hand. If two were cut off, how many would you have left on?

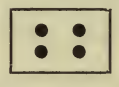
Alice had four kittens, but three of them died. How many has she left?

How many ears have two rabbits?

How many boys have four heads?

How many bicycles have as many wheels as a wagon?

The Number Five.



21. How many dots on the left-hand card?

How many *more* are on the other card?

How many *fingers* on your left hand?

How many, counting the thumb?

Tell me the names of five boys.

How many cents is a nickel worth?

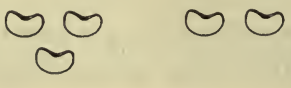
What number follows four?

What number is between three and five?

I have four beans. Give me enough to make five.

Take three blocks. Now take enough more to make five.

Take five beans. Separate them into two piles, thus:



Two beans and three beans are how many beans?

Take one bean from the smaller pile and put it into the larger.

Now what two numbers make five?

Here are five rings. ○ ○ ○ ○ ○ Cover one of them. How many are not covered?

Cover two of them. How many can you see?

Ask your papa how many nickels make a quarter.

22. How many ones in ⁘ ?

Show me two *fives* with beans.

Show me five *twos* with beans.

By how many squares is D larger than C? Than B? Than A?

A and B together are as large as ——.

How can we make C as large as D?

Take one square from D and put it with B.

B is now as large as —— or ——.

Draw a line five inches long on paper.

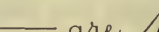
Draw a line five feet long on the blackboard.

23. Copy and complete, then read:

○ ○ ○ ○ and ○ are ——.

△ △ △ and △ △ are ——.

☆ ☆ and —— are ☆ ☆ ☆ ☆ ☆.

 less  are ——.

 less —— are 

One half of ☆ ☆ ☆ ☆ is ——.

24. Four dolls and one doll are how many dolls?

One finger and four fingers are —— fingers.

How many splints will make a triangle and a tent, if the tent is made like this ⋀ ?

Sam had five cents. He spent one cent for candy. How many has he left?

Fred had five marbles and lost four. How many has he left?

We have school five days each week. If you stay at home two days, how many days do you come to school?

Ned had five chickens. The cat killed three of them. How many has he left?

If your papa gives you a cent every day, in how many days will you have a nickel.

Jennie bought a tablet for four cents. She gave the clerk a nickel. How many cents should she receive back?

The Number Six.

25. Here are five splints. Make a triangle and then make a tent like this /\.

Can you make two triangles with the same splints?

How many *more* splints do you need?

How many dots are on the card to the left?

How many more dots are on the other card?

Five dots and one dot are how many dots?

Hold up six fingers.

Here are twelve splints. Make as many tents like that above as you can with them. Now count them.

What number follows five? What number comes before six? Before five?

I have five cubes. Give me enough to make six cubes.

Take six blocks. Put four in one pile, two in another.

Are six blocks as many as four blocks and two blocks?

Now arrange the six blocks in two equal rows.

How many are in each row?

Three blocks and three blocks are how many blocks?

How many dots are here? ••• | ••• Cover one of them. How many do you see?

One dot from six dots leaves how many dots?

Cover two of them. Tell me what you see.

Two dots from six dots leaves how many dots?

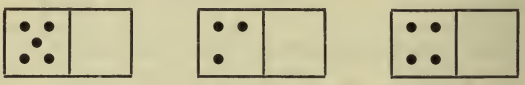
Cover three dots. How many can you see?

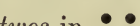
Three dots from six dots leaves how many dots?

How many dots can you see if you cover four of them?

Cover five of them. Tell me what you see.

Copy the cards below, and put in the dots needed to make six dots on each card.



26. How many *twos* in  ? How many *threes?*

Show me two *sixes* with cubes.

How many cubes have you used?

Cut a strip of paper two inches long.

How many strips are as long as your foot-rule?

Cut a strip of paper six inches long and one inch wide.

Into how many square inches can you cut it?

Draw a line six feet long on the blackboard.

Measure the line with this yardstick. How many yards long is it?

A line six feet long is —— yards long.

Ask your mamma how many eggs there are in a half-dozen.

27. Copy and complete, then read:

☆ ☆ ☆ ☆ ☆ and ☆ are ——.

□ □ and □ □ □ □ are ——.

/// and /// are ——.

• • • • and —— are ⁘.

○ ○ ○ ○ ○ ○ less ○ ○ are ——.

△ △ △ △ △ △ less —— are △ △.

One-half of ⛵ ⛵ ⛵ ⛵ ⛵ ⛵ is ——.

28. How many days in a week, not counting Sunday?

George gave me five roses and Ed gave me one. How many did I then have?

One pig and five pigs are —— pigs.

Robert is four years old. How old will he be in two years?

Two bears and four bears are how many bears?

There are three cows on each side of a fence. How many cows are there?

Name two numbers that make six. Two other numbers.

From six blocks take away two blocks. How many are left?

How many more are six cents than one cent?

Then what two pieces of money make six cents?

This morning I had six apples. Now I have only three. How many have I eaten?

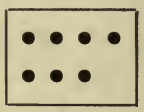
What *part* of them have I eaten? What part have I left?

Make six dots on your slate. Put a ring around one-half of them.

One-half of six dots is —— dots.

Ask your papa how many cents will pay for three two-cent stamps.

The Number Seven.



29. Make two △'s with these six splints.

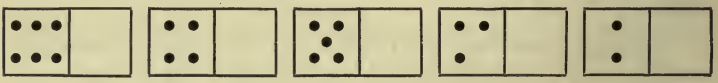
Can you make a triangle and a square with the same six splints? Why not?

How many more splints do you need?

Six dots and one dot are how many dots?

Show me seven dots. Seven cubes.

Copy these cards:



I want you to make each card have seven dots.

Name two numbers that together make seven. Two other numbers.

Here are four blocks. Add enough to make seven.

Now take two away. How many remain?

Here are one-cent, two-cent, three-cent, four-cent, and five-cent postage stamps. Pick out any two that you can buy with seven cents.

30. Make pictures of seven tents.

Draw a line around three of them. How many are outside?

Show me two sevens with dots.

Cut out a strip of paper seven inches long and one inch wide.

Into how many square inches can you cut it?

Draw a line one inch long. Close to the right end draw a line six inches long.

Now draw a line below them as long as both.

How many inches long is this line?

This line ——————|—————— is two inches long. How much longer is a seven-inch line?

31. Copy and complete:

○ ○ ○ ○ ○ and ○ ○ are ——.

⛺ ⛺ ⛺ ⛺ and ⛺ ⛺ ⛺ are ——.

☆ ☆ ☆ and —— are ☆ ☆ ☆ ☆ ☆ ☆ ☆.

□ □ □ □ □ □ □ less □ □ are ——.

△ △ △ △ △ △ △ less —— are △ △.

• • • • • • • less • • • are ——.

32. How many days in a week?

Name the days of the week, beginning with Sunday.

The middle of the week is W————.

On Wednesday morning how many days of the week are gone? How many are left?

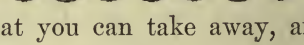
How many sides have a △ and a □?

Five girls and two boys went out. How many are out?

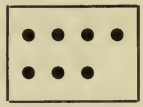
When one comes in, how many will be out?

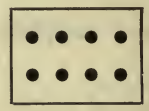
Each week we come to school five days and stay at home —— days.

Joe had seven cakes. The cat took three of them. How many had he left?

Here are seven apples.  Name each number of apples that you can take away, and tell how many will remain.

The Number Eight.





33. Make a triangle and a square with splints. How many splints have you used?

Try to make two squares with the splints.

How many more splints must you have?

Seven splints and one splint are how many splints?

Show me eight dots. Show me eight buttons. Point to eight corners in this room.

Make a pile of eight blocks.

Now make two piles of them, putting the same number in each. How many in each pile?

Four blocks and four blocks are how many blocks?

Take a block from one pile and place it on the other. Now how many in each pile?

Five blocks and three blocks are how many blocks?

Take another block from the smaller pile and place it on the larger. How many in each pile?

Six blocks and two blocks are how many blocks?

Name two numbers that make eight. Two other numbers. Who can name still two other numbers?

What number comes before eight? Before seven? Before six? Before five?

What number is between five and seven? Between six and eight?

A nickel and how many cents make eight cents?

Copy these blank cards, and put in each the number of dots indicated by the word written under it:

34. Make four dots, thus: ⁘. Draw a line around one-half of them.

Into how many *equal parts* have you divided them?

One-half of four dots is —— dots.

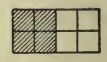
Make eight dots, thus: ⁘⁘.

Draw a square around one-half of them. Draw a line around the other half.

One-half of eight dots is —— dots.

Show me one-half of six dots.

How many squares are there here?



What part of them is black?

Four squares are one-half of —— squares.

How much of this circle is black?

A dollar is worth how many half-dollars?

Find by trial to-night how many quarts in a half-gallon.

35. How many *fours* in ⁘⁘? How many *twos?*

Show me eight shoes. How many *pairs* are there?

Draw four rings above a line, and four below it. How many *times* did you draw four rings?

Draw a line around one-half of the rings. How many rings are inside of the line?

Make pictures of eight tents, four in a row. Cross out one-half of them. How many are left?

Make pictures of eight stars, two in a row. How many rows have you?

Make pictures of one-half of eight squares.

Tell all you can about these figures.

Two horses need —— pairs of shoes. In four pairs there are —— shoes.

The spider has —— legs. How many pairs of legs does the spider have?

36. Copy and complete:

△ △ △ △ △ and △ △ △ are ——.

• • • • • • and —— are ⁘ ⁘.

× × × × and × × × × are ——.

/ / / / / / / and / are ——.

⛺ ⛺ ⛺ ⛺ less ⛺ are ——.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ less —— are ☆ ☆ ☆.

One-half of ⁘ ⁘ is ——.

37. Seven bugs and one bug are how many bugs?

One bean and seven beans are —— beans.

A man has six white sheep and two black sheep. How many sheep has he?

There are five eggs in a dish. We need eight for dinner. How many more must we find?

Mr. Jones has eight horses in two fields. There are four in one field. How many are in the other field?

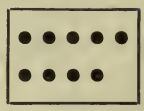
Eight birds were sitting on a fence. A bad boy shot one. How many were left?

A boy had two fingers cut off. How many were left on?

We have two gallons of milk. How many quarts have we? Find by trial.

Draw a figure four squares long and two squares wide. This figure contains —— squares.

The Number Nine.



38. Make two squares with splints. How many splints have you used?

Try to make three triangles with the splints. How many more splints do you need?

How many more than eight dots are on the card to the right?

Eight dots and one dot are how many dots?

Take nine blocks and lay them in a row.

Push one away. How many are left?

One block and eight blocks are how many blocks?

One block from nine blocks leaves how many blocks?

If you push three blocks away, how many will be left?

Take away all but two. How many have you taken?

Lay the nine blocks in three rows, three in a row.

Now tell me how many threes make nine.

Copy these cards:

Add enough dots to make each card have nine.

Name two numbers that together make nine. Two other numbers.

How many splints will make three triangles?

Draw a square like this:

How many of the nine small squares are white?

Make another black. Two black squares and ——— white squares are nine squares.

Cut out a paper triangle three inches on a side. How long are all the sides?

Copy these squares, and put in each square the number of dots indicated by the word written under it:

none four six eight nine

39. There are eight pigs in the pen and one on the road. How many pigs?

The white hen has seven chicks, the black hen has two. How many chicks?

There are six eggs in one nest and three in another. How many eggs in both nests?

Five boys and four girls are how many children?

Dan has three pennies, Nell has three, and Kate has three. How many have they all?

Nine sheep were in a field, but one jumped out. How many were left in?

Here are nine tents,

If the wind blows two down, how many will remain standing?

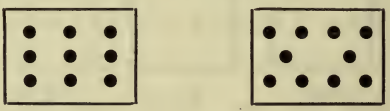
If I take three of them away, how many will be left?

How many times can you take three tents away?

If a book costs nine cents, it will take a nickel and—— pennies to pay for it.

This line on the blackboard is nine feet long. Find how many yards long it is.

The Number Ten.



40. How many fingers and thumbs have you? How many more than nine?

Make a pile of ten blocks.

How many cents is this dime worth? 

Copy, and add dots enough to make ten dots on each card:

Make eight tents and two tents. How many have you made?

Make seven stars and three stars. How many?

Draw six rings and four rings. How many rings?

Five fingers and five fingers are how many fingers?

How many dots on the right-hand card?

How many *fives* do you see on it?

How many nickels make a dime?

How many tents can you make with ten splints, if the tents are made like this  ?

Name two numbers that make ten. Two other numbers.

Lay ten blocks in a row. Push one away. How many are left?

If you take two away, how many will be left?

Two blocks from ten blocks leaves how many blocks?

Draw a square. Make ten dots. Now put one half of the dots inside the square.

One-half of ten dots is how many dots?

Make two piles of ten blocks each. How many *tens?*

Two tens and three tens are how many tens?

Nine fives and one five are how many fives?

Use dots to show me three twos.

Four twos and one two are how many twos?

Show me five twos with dots. How many *ones?*

How many fingers have two boys?

How many clocks have ten hands?

Find whether this room is ten yards long.

How many feet less or more?

41. Willie had nine cents and his uncle gave him one more. He then had —— cents, or one ——.

How many children are eight boys and two girls?

A week and three days are how many days?

This line on the blackboard is ten inches long, and this one is nine inches long. How much longer is one than the other?

Dan had ten cents. He spent two cents for a pencil. How many cents had he left?

A man had three of his toes cut off. How many were left on?

Bessie started to the store with ten cents (two nickels), but lost one-half of her money. How much had she left?

How many two-cent stamps are worth a dime?

If you have ten cents, how often can you spend five cents?

If one orange costs five cents, how much money will be needed to buy two oranges?

The Numbers Eleven and Twelve.

42. How many dots are on the left-hand card? How many more than ten?

Ten dots and one dot are how many dots?

A dime and a penny are how many cents?

Here is one block. Put enough more here to make eleven.

Name two numbers that make eleven. Two other numbers.

Make two squares and a triangle with splints. How many splints have you used?

Try to make three squares with the same splints. How many more do you need?

Eleven splints and one splint are how many splints?

Make a pile of twelve blocks.

Now take two blocks away. How many are left?

Twelve blocks are how many more than ten blocks?

How many dots do you see here? ⁘ ⁘

How many *sixes* in twelve? How many *twos?* How many *fours?*

Cut a strip of paper six inches long. How many strips are as long as your foot-rule?

How many *six-inches* in twelve inches?

Find how many strips each four inches long are as long as your ruler.

How many *four-inches* make twelve inches? How many *two-inches?*

Make twelve tents with splints. Let the wind blow down one-half of them. How many are left?

43. Twelve boys are how many more than eleven boys?

There are ten eggs in a nest. When the hen lays two more there will be —— eggs in the nest.

My two horses ate twelve ears of corn. The gray horse ate six ears. How many ears did the bay horse eat?

Mamma bought a dozen oranges at the store. We ate six for breakfast. How many were left?

I found a nest with twelve eggs in it. I took out all but one. How many did I take?

Twelve of Mr. Smith's sheep were sick. Two of them died. How many got well?

Six boys were playing soldiers on one side and five on the other. How many boys were there altogether?

Henry's father gave him a dozen pencils. How many had he left after using four?

Marvin has a five-cent piece and three pennies. How many more cents must he have to pay for a top worth eleven cents?

Harry's knife has two blades. How many blades do six such knives have?

We learned five new words yesterday. If we learn one more to-day than we did yesterday, how many have we learned in both days?

PRIMARY NUMBER WORK.

44. How many *ones* on the middle card? How many twos?

Two dots are how many more than one dot?

Three dots are how many more than two dots?

How many dots on the first two cards?

Cover two of the dots on the last card. How many do you see?

One dot and one dot are —— dots.

Two tents and one tent are —— tents.

One square and two squares are —— squares.

Two stars less one star are —— star.

Three tents less one tent are —— tents.

Make pictures of:

Two stars and one star are three stars.

One tent and two tents are three tents.

Three dots less one dot are two dots.

Three rings less two rings are one ring.

How many ones in two? In three? What two numbers make three?

Make the *figure* that stands for the number *one* — *1*.

Make the *figure* that stands for the number *two* — *2*.

Make the *figure* that stands for the number *three* — *3*.

Use figures instead of these pictures :

☆☆ and ☆ are ☆☆☆.

 less  are  .

□□□ less □□ are □.

2 dots and 1 dot are —— dots.

1 star and 1 star are —— stars.

2 tents less 1 tent are —— tent.

3 cents less 1 cent are —— cents.

3 squares less two squares are —— square.

45. Here are some squares:

□ 1
□□ 2
□□□ 3

Write the figure for the number of squares in the upper row.

Under this write the figure for the number of squares in the second row.

One square and two squares are —— squares.

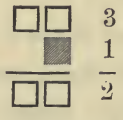
Write 3 under the 2 with a line between. Is 3 the number of squares in both upper rows?

Three squares is the *sum* of one square and two squares.

Finding the sum of two or more numbers is called **adding.**

Add these numbers:

1	2	1
1	1	2



Take one square from 3 squares. How many are left?

Taking one number from another is called **subtracting.**

Subtract the following:

2	3	3
1	1	2

46. Add:

1 foot	2 cents	1 yard
2 feet	1 cent	1 yard

Subtract:

2 feet	3 yards	3 cents	2 tops
1 foot	1 yard	2 cents	2 tops

Complete:

1 and 1 are ( ). 2 less 1 are ( ). 3 less 2 are ( ).
2 and 1 are ( ). 2 and ( ) are 3. 3 less ( ) are 2.
1 and 2 are ( ). 3 less 1 are ( ). 3 less ( ) are 1.

47. Make a picture for 2 and 1 are 3. (⁘ and • are ⁘).

Tell a story about 1 and 1 are 2.

ANS.—My dolly had 1 dress, and I made her 1 more. She then had 2 dresses.

Tell a story about 1 and 2 are 3.

Emma has two pairs of shoes, and Lillie has one pair. How many pairs have they both?

Mary had three dimes, but lost one. How many had she left?

Tell another story about 3 less 1 are 2.

My hat cost two dollars. I have paid one dollar. How much do I owe?

We have three quarts of milk for sale. How many *times* can we sell one quart?

Then how many quarts are 3 times 1 quart?

How many fives are one five and two fives?

Clara ate one peach, and has two left. How many had she at first?

John had three marbles and gave one to Sam. Ask a question and answer it.

Here are 3 pears.  How many boys can each have 1 pear?

How many *ones* in 3?

Count forwards to three, then backwards to one.

Tell me some things you have learned about the number *three*.

Four  4

48. How many ones are pictured on this card? How many twos?

Four dots are how many more than three dots? How many more than two dots?

Name two numbers whose sum is four. Two other numbers.

Show with splints that your answers are correct.

Here are four tents. Cover one. How many are not covered?

If two tents were taken away, how many would be left?

How many times can one tent be taken away?

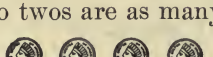
Then four times one tent are —— tents.

Here are four blocks. Eva may take two blocks. Now she may take two more.

How many times has she taken two blocks? How many blocks has she?

Then two times two blocks are —— blocks.

Show with pegs that two twos are as many as four ones.

Here are four cents.  How many girls can have one cent each? How many *ones* in four?

How many boys can have two cents each? How many twos in four?

49. Separate four blocks into *two equal parts*, thus:

What is one part called?

What must you do with an apple to get *one-half* of it? (Divide it into two equal parts.)

What must you do with four blocks to find one-half of them?

If anything is divided into *two equal parts*, what is one of the parts called?

In an apple there are —— half-apples.

How many halves make a whole pie?

One half from two halves leaves —— half.

Draw two squares and divide them into halves.

In two squares there are —— half-squares.

We write **one-half** thus: $\frac{1}{2}$.

Two blocks are $\frac{1}{2}$ of —— blocks.

Write the figure that stands for the number *four* — 4.

50. The sign + stands for **and.** Copy the following, using + instead of *and:*

1 and 1 are 2.	3 and 1 are 4.
2 and 1 are 3.	2 and 2 are 4.

Read these:

1 + 2 are 3.	1 + 3 are 4.
1 + 1 are 2.	2 + 2 are 4.

The sign — stands for **less.** Copy the following, using — instead of *less:*

2 less 1 are 1. 3 less 2 are 1.
3 less 1 are 2. 4 less 1 are 3.

Read these:

3 — 1 are 2. 4 — 2 are 2.
3 — 2 are 1. 4 — 3 are 1.

We may use the sign = for **are.**

Read these:

$2 + 1 = 3$. $2 + 2 = 4$. $4 - 2 = 2$.
$3 + 1 = 4$. $4 - 1 = 3$. $3 - 2 = 1$.

Copy and complete:

$3 + 1 = (\ )$. $3 + (\ ) = 4$. $4 - 2 = (\ )$.
$1 + 3 = (\ )$. $1 + (\ ) = 4$. $4 - 1 = (\ )$.
$2 + 2 = (\ )$. $2 + (\ ) = 4$. $4 - 3 = (\ )$.
$4 = 3 + (\ )$. $4 - (\ ) = 3$. $4 - (\ ) = 2$.
$4 = 1 + (\ )$. $4 - (\ ) = 1$. $4 = 2 + (\ )$.

NOTE.—To secure facility on the part of the pupils the teacher should, as often as may be found necessary, require them to announce results *at sight.* He should also train them to give answers immediately upon *hearing* the numbers and operations named. This applies to all exercises involving the "combinations."

51. Make a picture for $2 + 2 = 4$.

($\star\star + \star\star = \star\star\star\star$)

How many boys together have as many legs as a horse?

George earned one quarter on Monday and three quarters on Tuesday. How much did he earn in both days?

Ask your papa how many quarters there are in a dollar.

Tell a story about $3 + 1 = 4$.

I bought four pounds of meat. Two pounds of it was pork and the rest beef. Ask a question and answer it.

Charlie has four rabbits and Paul has one less. How many has Paul?

How many more fingers than thumbs has your hand?

Count from one to four; then count from four back to one.

If one-half of a lemon is worth two cents, how much is the lemon worth?

If a cake is worth four cents, how much is one-half of it worth?

One half-dollar and one half-dollar are ——.

PINT

QUART

GALLON

52. Which of these measures is the largest? Which is the smallest?

Fill each measure with water, then tell me which is the heaviest.

The gallon measure is full of water. Find how many times it will fill the quart measure.

Find how many times you can fill the quart measure and empty it into the gallon measure.

One gallon is as much as —— quarts.

4 quarts make 1 gallon.

Mabel had a gallon of milk, but fell and spilled a quart. She had —— quarts left.

Papa brought home a gallon of oil in a can. There is only one quart in it now. How much has been used?

Fill the pint measure and empty it into the quart measure. How many times must you do this to fill the quart measure?

One quart is as much as —— pints.

2 pints make 1 quart.

A pint is what part of a quart?

Two quarts are what part of a gallon?

When milk is two cents a pint, how much does a quart cost?

Jennie paid four cents for a quart of vinegar. How much did a pint cost?

Mamma gave four quarters for a gallon of molasses. How much did a quart cost?

Tell a story about a quart and a gallon.

Tell me some things you have learned about the number *four*.

Five  5

53. How many dots on this card? Of what number are they a picture?

Without the one in the center, how many are there?

Cover the two at the right. How many can you see?

Are three dots and two dots as many as four dots and one dot?

Name two numbers whose sum is five. Two other numbers.

What number is one less than five? Two less?

Are five ones as many as one five?

Which would you rather have—five pennies or a nickel? Why?

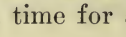
Count these squares, beginning at the left. □■□□□

Which square did you call *one?* Which did you call *two?*

Is the black square really two squares, or merely another *one* square?

The first square and the second square are how many squares?

Make the figure that stands for the number *five* — *5*.

54. Here are five balls. 

If Owen takes 1 ball at a time for 5 times, how many balls will he have?

Then 5 times 1 ball are how many balls?

5 times 1 are how many?

Here are five cents. 

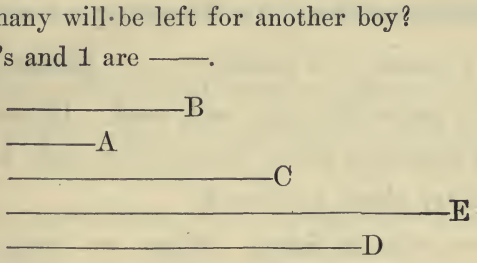
How many boys can have 1 cent apiece?

How many *ones* in 5?

How many boys can have 2 cents apiece?

How many will be left for another boy?

Two 2's and 1 are ——.



The line D and the line A equal which line?

The line B and the line C equal which line?

The line B is how many times as long as the line A?

The line D is how many times as long as the line B?

If from the line E we take a line equal to the line A, which line will the remainder equal?

Show me the number of blocks these figures represent: 3, 5, 1, 4, 2.

Now make the figures that represent the number of blocks I show you. (Show blocks.)

55. Copy, complete, and read:

$4+1=(\ ).\quad 5-1=(\ ).\quad 4+(\ )=5.\quad 5-(\ )=3.$

$1+4=(\ ).\quad 5-4=(\ ).\quad 3+(\ )=5.\quad 5-(\ )=2.$

$3+2=(\ ).\quad 5-2=(\ ).\quad 5-(\ )=4.\quad 5=4+(\ ).$

$2+3=(\ ).\quad 5-3=(\ ).\quad 5-(\ )=1.\quad 5=2+(\ ).$

56. Make a picture for $3 + 2 = 5$.

Four little toes and one great toe are —— toes.

My hat cost three dollars and my shoes two dollars. How much did both cost?

A lady bought two pounds of coffee at one store and three pounds at another. Ask a question and answer it.

2 pounds + 3 pounds = —— pounds.

We have school five days each week. If you stay at home two days, how many days do you come to school?

Tell a story about $5 - 4 = 1$.

It is five miles to Salem. When we have traveled three miles, how far have we yet to go?

This line on the blackboard is one foot long, and this one is five feet long. Tell me all you can about the two lines.

In ○ ○ and D, how many half-circles are there?

For a nickel I can buy —— 2-cent stamps and —— 1-cent stamp.

Tell some other things you can buy with a nickel.

Helen, please tell all you know about *four*.

ANS.—3 and 1 are four, 2 and 2 are four, 1 and 3 are four; two twos are four; 4 less 1 are three, 2 from 4 leaves two, etc., etc.

James, be kind enough to state what you know about *five*.

Six  6

57. How many cents can you get for a nickel?

If I should give you one more penny, how many cents would you have?

Would you have a cent for every dot on this card?

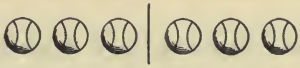
Show me five fingers and one finger. How many?

Draw a line four inches long. At one end of it draw a line two inches long. Both together make a line —— inches long.

Here are six tops. 

If Ben takes two tops at a time for three times, how many tops will he have?

Then how many tops are 3 times 2 tops?

Here are six balls. 

Jack may take 3 balls; then 3 more.

How many times has Jack taken 3 balls?

Here are 6 marbles. 

How many boys can have 1 marble each?

How many *ones* in 6?

How many boys can have 2 marbles each?

How many *twos* in six?

How many boys can have 3 marbles each?

How many *threes* in six?

How many threes do you see on the card? Two threes are ——.

How many twos are on the card? Three twos are ——.

Show me with blocks that two threes are as many as three twos.

Here are four squares. ☐ ☐ ☐ ☐ How many more must we draw to have six?

The sum of five and one is six. Name two other numbers whose sum is six. Two others.

Draw a line six inches long on your slate. Rub out one inch of it. How long is the remainder?

If two dots are taken from six dots, how many dots will remain?

Make the figure that stands for the number *six* — *6*.

58. Divide 6 dots into three equal parts thus:

• • | • • | • •

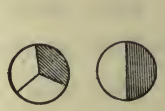
How many dots are there in each part?

When a number of things is divided into *three equal parts*, each part is *one-third* of the whole number.

What is one-third of 6 dots? One-third is written — $\frac{1}{3}$.

$\frac{1}{3}$ of 6 cents is —— cents.

Into how many equal parts is the first circle divided? The second?



What part of the first circle is dark?

What part is light?

How much of the second circle is dark?

Which is greater—one-half or one-third of anything?

Two thirds of a pie and one third of a pie are how much of the pie?

Cut this apple, giving one-third to John, one-third to Charley, and keeping one-third yourself. In one apple how many thirds of an apple?

In 2 apples there are —— thirds of an apple?

59. Copy, complete and read:

$5 + 1 = (\ )$. $3 + 3 = (\ )$. $6 - 4 = (\ )$. $2 + (\ ) = 6$.
$1 + 5 = (\ )$. $6 - 1 = (\ )$. $6 - 3 = (\ )$. $6 - (\ ) = 4$.
$4 + 2 = (\ )$. $6 - 5 = (\ )$. $4 + (\ ) = 6$. $1 + (\ ) = 6$.
$2 + 4 = (\ )$. $6 - 2 = (\ )$. $6 - (\ ) = 2$. $\frac{1}{3}$ of $6 = (\ )$.
$3 + (\ ) = 6$. $6 - (\ ) = 3$. $\frac{1}{2}$ of $6 = (\ )$. $\frac{1}{3}$ of $3 = (\ )$.

60. Make a picture for $3 + 3 = 6$.

Harry made five rings and Stella made one. How many did both make?

Maud, you may draw two circles. Annie may draw four. How many have both drawn?

The black cow gives a gallon of milk, the red cow two quarts. How much do both give?

There are three horses on each side of a fence. How many horses are there? Draw the picture.

Draw a line two yards long. How many feet long is it?

A lady who had six dollars gave one dollar for gloves. Ask a question and answer it.

A man had six ten-dollar bills, but spent two of them. How many had he left?

Henry gets two dollars a day. How much does he earn in three days?

Our hens lay three eggs a day. How many do they lay in two days?

A man gets six dollars for working a day. How much does he get for working half a day?

Tell a story about $6 - 3 = 3$.

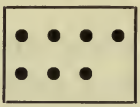
If one orange costs 3 cents, what does one-third of the orange cost?

If one-third of a melon is worth 2 cents, what is the whole melon worth?

Alice has one-half of 6 cents and Frances has one-third of 6 cents. Which has the more money?

Who wants to tell me all about *six?* James may tell.

Now you may all go to the board and write what he has told us.

Seven  7

61. Make two triangles with splints. How many have you used?

Can you make a triangle and a square with the same splints? How many more do you need?

Six dots and one dot are —— dots.

How many days in a week? Name them.

Draw a line six inches long, and another one inch long. What is the length of both lines?

Take seven blocks. Take two of them away. How many are left?

Five blocks and two blocks are —— blocks.

Now take three blocks from the seven. How many in each pile?

Cut out a strip of paper seven inches long. Cut off an inch from one end. What is the length of the part left?

This line on the blackboard is four feet long. Make it seven feet long. How long is the line you have drawn?

Draw a line seven inches long on the blackboard. Helen may rub out one inch of her line. How long is the part left?

Tom may rub out two inches of his line. How much of the line is left?

Hester may erase three inches of her line. Tell me something about the part left.

Name two numbers whose sum is seven. Two other numbers.

How many are □□ and □□ and □□ and □ ?

Can you name three numbers that together make seven?

Show me the number of blocks these figures stand for: 6, 7, 5, 4, 3.

Make the figures that stand for the number of balls I hold up.

62. Copy, complete and read:

$6+1=(\ ).\quad 5+(\ )=7.\quad 7-1=(\ ).\quad 7-3=(\ ).$
$5+2=(\ ).\quad 3+(\ )=7.\quad 7-6=(\ ).\quad 7-4=(\ ).$
$4+3=(\ ).\quad 1+(\ )=7.\quad 7-2=(\ ).\quad 7-(\ )=5.$

Add quickly:

5	6	4	1	2	3
2	1	3	6	5	4

Subtract at sight:

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

63. You come to school five days each week. How many days do you stay at home?

What two pieces of money make seven cents?

There are half a dozen eggs in one nest and one in another. How many eggs in both?

Tell a story about $7 - 1 = 6$.

Four boys and three girls are how many children?

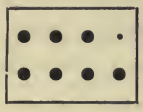
How many sides have a triangle and a square?

Seven boys went to town, but only five returned. How many stayed in town?

This is Tuesday. How many more days in this week?

There were seven windows in a room, and two of them were open. How many were shut?

How many quarts are a gallon and three quarts?

Eight  8

64. How many dots are on this card?

How many large dots? How many small dots?

Eight dots are one more than what?

Here are six blocks. Give me enough to make eight.

Now make two piles of them with the same number in each. How many blocks in each pile?

Take one block from one pile and place it on the other. Now how many in each pile?

Take one block from the smaller pile and place it on the larger. Now how many in each pile?

Make eight dots on your slate.

Albert may erase one and tell how many are left.

Carrie may erase two and tell how many she has left.

Jack may erase three and tell us about the others.

Jill may erase four and tell us how many she did not rub out.

Count to eight, then back to one.

Count to eight by twos. How many twos in eight?

Show me one half of eight blocks.

How many fours in eight?

Two blocks are what part of four blocks?

65. Here are eight stars. 

Into how many parts are they divided?

Has each part the same number of stars?

One of the four equal parts of anything is called *one-fourth*. (Fourths are often called *quarters*.)

One fourth of eight stars is —— stars.

Make eight tents. Draw a ring around one fourth of them.

Make eight dots. Call them pigs. Put one fourth of them into a pen.

Now put another fourth of them into a pen.

How many pigs are not in a pen?

What part of the eight pigs are not in a pen?

How many fourths of the eight pigs are penned up?

Are two fourths of the pigs as many as one half of them?

Ask your mamma to show you a fourth of a dollar, and tell me all you can about it to-morrow.

One fourth ($\frac{1}{4}$) of eight cents is —— cents.

A quart is what part of a gallon?

Ask your papa to-night what measures are used to measure potatoes, and tell me something about them to-morrow.

Make the figure that stands for the number *eight* —8.

66. Copy, complete and read:

$7+1=(\ ).\quad 5+3=(\ ).\quad 8-1=(\ ).\quad 8-4=(\ ).$

$6+2=(\ ).\quad 4+4=(\ ).\quad 8-2=(\ ).\quad 8-3=(\ ).$

$1+(\ )=8.\quad 3+(\ )=8.\quad 8-(\ )=1.\quad 8-(\ )=4.$

$2+(\ )=8.\quad 4+(\ )=8.\quad 8-(\ )=2.\quad 8-(\ )=3.$

$\frac{1}{2}$ of $8=(\ ).\qquad \frac{1}{4}$ of $4=(\ ).\qquad \frac{1}{4}$ of $8=(\ ).$

67. How many pints are there in a gallon of milk?

If you drink two pints of it, how much will be left?

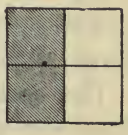
What part of the gallon will be gone?

Six rats were caught in one trap and two in another. How many rats were caught?

Tell a story about $5 + 3 = 8$.

Dick has four marbles and John has four. How many have they both?

How many fourths of this square are black?



Is one half of the square white?

One square is what part of four squares?

Two squares are what part of four squares?

Which is more—one half of four apples, or one fourth of them? Draw the picture.

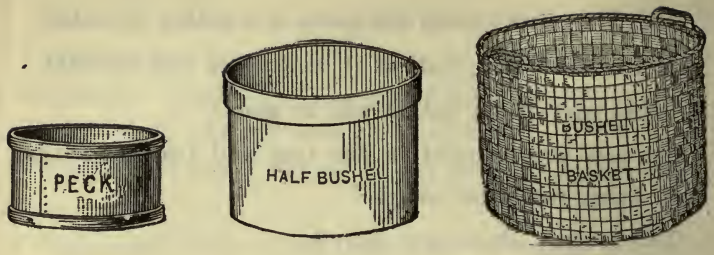
One half of anything is as much as —— fourths of it.

Tell a story about $8 - 5 = 3$.

A boy has eight rabbits. Four of them are white. The rest are black. How many are black?

This line on the blackboard is two yards and two feet long. What is its length in feet?

Ray has eight cents and Elsie has a nickel. Ask a question and answer it.



68. Have you ever seen these measures? Which measure is the largest?

Clyde may tell me some of the things he has seen measured by them. Who can tell me something more about them?

The bushel basket is full of corn. Find how many times you can fill the peck measure from it.

Find how many times you can fill the peck measure and empty it into the bushel measure.

In one bushel there are —— pecks.

4 pecks make 1 bushel.

When you buy a bushel of potatoes, how many pecks do you get?

A peck is one —— of a bushel.

How many pecks will fill the half-bushel?

If a bushel basket is half-full of potatoes, how many more pecks of potatoes will it hold?

Fill the peck and the half-bushel with apples, and empty them into the bushel basket. Is the basket full? How much more will it hold?

How many half-bushels does it take to fill the bushel?

Two pecks are what part of a bushel?

When nuts are a dollar a peck, how much does a bushel cost?

If plums are worth two dollars a bushel, how much must I pay for a half-bushel?

There are eight pecks of wheat in a sack. How many bushels are in it?

If we eat a peck of apples each week, how long will a bushel last?

How many half-pecks will fill the bushel?

A peck is one fourth of a bushel.

Two pecks are —— fourths of a bushel.

Three pecks are —— fourths of a bushel.

A half-bushel and a peck are —— pecks, or —— fourths of a bushel.

Papa bought a bushel and a half of beets. How many pecks did he get?

How much must you pay for four bushels of clover seed at two dollars a bushel?

Nine  **9**

69. How many more than eight dots are on this card?

Eight dots and one dot are —— dots.

There are three dots in one row. How many in two rows? In three?

How many splints are needed to make three triangles?

How many threes in nine?

This line on the board is seven inches long, and this one is two inches long. What is their combined length?

Put five blocks in one pile and four in another. Put the piles together. How many blocks?

Take three blocks away. How many now in each pile?

Six blocks and three blocks are —— blocks.

Make nine tents with splints. Take away two. How many are left?

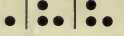
Cover three of the dots on the card. How many can you see?

Here are nine beans. Take away all but four. How many have you taken?

Use blocks to find answers:

Two blocks from nine blocks leaves —— blocks.
Seven blocks from nine blocks leaves —— blocks.
Three blocks from nine blocks leaves —— blocks.
Six blocks from nine blocks leaves —— blocks.
Four blocks from nine blocks leaves —— blocks.
Five blocks from nine blocks leaves —— blocks.

Make the figure that stands for the number *nine* — *9*.

70. Into how many equal parts are these nine dots divided? 

One of the three equal parts of anything is called *one third.*

One third of nine dots is —— dots.

One third of six stars is —— stars. 

Into what is this circle divided? 

What part of it is black? How many thirds of it are white?

One third of the circle and two thirds of it are how much of the circle?

In anything there are —— thirds.

Make 9 dots. Draw a ring around one-third ($\frac{1}{3}$) of them.

$\frac{1}{3}$ of  = ——. $\frac{2}{3}$ of  = ——.

Draw a line $\frac{1}{3}$ of 9 inches long.

Draw a line $\frac{2}{3}$ of 9 inches long.

Show me $\frac{1}{3}$ of six splints.

Show me $\frac{2}{3}$ of six splints.

Show me $\frac{3}{3}$ of six splints (all of them).

One third of six dollars is —— dollars.

Two thirds of six dollars is —— dollars.

Here are some squares. □□□ □□□ □□□

Henry may make 3 squares at a time for 3 times.

How many squares has he made?

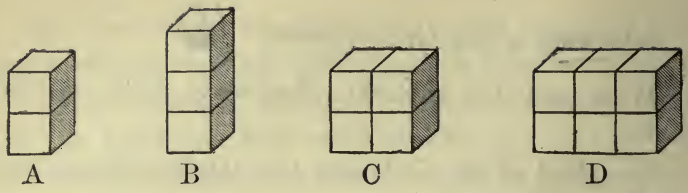
How many squares, then, are 3 times 3 squares?

How many are 3 times 3, or 3 threes?

How many times is 3 squares found in 9 squares?

Draw a line 9 inches long. Measure it with a 3-inch measure.

How many times does it contain the 3-inch line?



How many times does C contain A?
C is how many times A?
How many times does D contain B?
D is how many times B?
B is what part of D?
A is what part of C?
D is how many times A?
A is what part of D?
C is what part of D?

71. Copy, complete and read:

$8+1=(\ ).\quad 4+(\ )=9.\quad 9-1=(\ ).\quad 9-4=(\ ).$
$7+2=(\ ).\quad 2+(\ )=9.\quad 9-8=(\ ).\quad 9-6=(\ ).$
$6+3=(\ ).\quad 1+(\ )=9.\quad 9-2=(\ ).\quad 9-3=(\ ).$
$5+4=(\ ).\quad 3+(\ )=9.\quad 9-7=(\ ).\quad 9-(\ )=4.$

3 times ● ● ● = ——. 2 times ⛵ ⛵ ⛵ ⛵ = ——.
3 times 3 = ——. 2 times 4 = ——.
○○ = $\frac{1}{2}$ of ( ). ☆☆ = $\frac{1}{4}$ of ( ).

2 times □□□ = ——.
2 times 3 = ——.
△△△ = $\frac{1}{3}$ of ( ).

72. Make a story for $8 + 1 = 9$.

Seven days and two days are how many days?

There are six eggs in a dish. If I put in three more, how many will be there?

Bertha came to school five days last week and four days this week. How many days did she come?

Albert had nine marbles but lost two. Ask a question and answer it.

Ada broke three of her nine eggs. How many had she left?

Homer had nine dimes. He gave six dimes for a book. How much had he left?

Mamma bought nine pairs of gloves, and gave Susie four pairs. How many pairs did she keep?

Papa had nine dollars; he spent all but two dollars for shoes. How much did the shoes cost?

Three girls wear six shoes. How many does one girl wear?

Mamma took nine yards of cloth to make three dresses for Bessie. How many yards in each dress?

Frank walked nine miles in three days. How far did he walk in one day?

Tell a story about $\frac{1}{3}$ of $9 = 3$.

73. How many dots do you see on this card?

If your two hands were cut off, how many would you have left?

Draw a line four inches long on your slate. Rub out four inches of the line. How much of it is left?

Ida had two pennies. She spent them for a pencil. How many pennies had she left?

Albert had four apples. He ate one and gave three to John. Ask a question and answer it.

Make a picture of *no* stars.

Make the figure that stands for *none* — 0.

The figure 0 is called *zero*, *naught*, or *cipher*.

When it stands alone it means *none to count;* but we shall soon make it work hard in a "double team."

Tell a story about $5 - 5 = 0$.

74. How many more than nine dots are on this card?

Nine dots and one dot are —— dots.

How many fingers and thumbs have you?

How many *fives* do you see on the card?

Put eight pegs in one pile and two in another. How many pegs in both piles?

Put one peg from the larger pile into the smaller. Now how many in each pile? In both?

Five pegs and five pegs are —— pegs.

Lay ten blocks in a row. Take one away. How many are left?

Use the ten blocks to find these answers:

Two blocks from ten blocks leaves —— blocks.

Eight blocks from ten blocks leaves —— blocks.

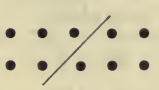
Three blocks from ten blocks leaves —— blocks.

Seven blocks from ten blocks leaves —— blocks.

Four blocks from ten blocks leaves —— blocks.

Six blocks from ten blocks leaves —— blocks.

Five blocks from ten blocks leaves —— blocks.

Make ten dots, thus: 

How many times did you make five dots?

Two times 5 dots are —— dots.

How many times did you make two dots?

Five times 2 dots are —— dots.

Divide ten blocks into piles, putting 2 blocks in each pile. How many times have you found 2 blocks in 10 blocks?

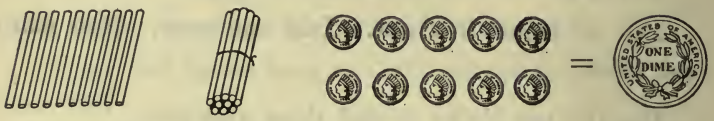
Then 10 blocks contains 2 blocks —— times.

10 blocks divided by 2 blocks = 5.

10 blocks divided by 5 blocks = 2.

Show me ten splints. Tie them in a bundle.

How many splints in the bundle? How many *ones* in it? How many *tens?*



Ten *ones* make one *ten.*

One ten and one ten are —— tens.

How many are 5 tens and 5 tens?

It takes more than one figure to stand for the number ten. We must now make 0 go to work. Ten is written thus: *10.*

Make ten dots. Draw a ring around one-half of them. How many are in the ring?

75. Copy and complete:

8+2=( ).	1+ 9=( ).	7+( )=10.	10—2=( ).
6+4=( ).	4+( )=10.	5+( )=10.	10—4=( ).
7+3=( ).	6+( )=10.	2+( )=10.	10—6=( ).
5+5=( ).	3+( )=10.	8+( )=10.	10—3=( ).
10—5=( ).	10—( )= 7.	10—( )= 8.	½ of 10=( ).

76. Write with proper signs:

From 10 take 3; 5; 7; 6; 8; 4.
From 9 take 4; 3; 6; 8; 5; 7.
To 3 add 4; 6; 5; 7; 2; 3.
To 2 add 5; 8; 7; 6; 4; 0.
Find one-half of 10; 8; 6; 4; 1.
Find one-third of 9; 6; 3; 1.
Find one-fourth of 8; 4; 1.

77. Dan walked 8 miles on Monday and 2 miles on Tuesday. How far did he walk in both days?

Tell a story about $10 - 2 = 8$.

The white hen has seven chicks and the black hen has 3. How many have they both?

Give a story for $10 - 3 = 7$.

George worked 6 days last week and 4 days this week. How many days did he work?

Sadie bought 10 yards of gingham. She used 4 yards for aprons, and had —— yards left.

How many nickels are worth 10 cents?

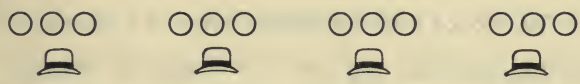
If you wish to pay me 10 cents, how many times must you give me 5 cents?

Two times 5 cents = —— cents.

How many 5-cents in 10 cents?

If I give you 2 cents five times, how much money will you have?

Five times 2 cents = —— cents.



If one hat costs 3 dollars, three hats will cost —— dollars.

How much will five 2-cent stamps cost?

For 9 cents I can buy —— 2-cent stamps, and I shall have —— ¢ left.

How many 2-cents in 10 cents? (Make the picture.)

10¢ divided by 2¢ means, *how many 2¢ are there in 10¢?*

How often can you cut 2 yards of silk from a piece 10 yards long? 10 yd. divided by 2 yd. = ( ).

Mamie went to the store with 10 cents in her pocket. She spent one-half of it. How much money had she left?

Tens.

78. How many cents equal a dime?

Then how many ten-cents is a dime worth?

How many ten-cents are the dimes on the left-hand card worth? On the right-hand card?

Two ten-cents and three ten-cents are —— ten-cents.

Eight dimes and two dimes are —— dimes.

Two dimes are worth *twenty* cents.

Place ten blocks in a column as in the picture.

Make another column of ten blocks. How many blocks in both columns?

10 blocks and 10 blocks are —— blocks.

One ten and one ten are —— tens, or *twenty*. We write twenty thus — 20.

Make another column of ten blocks. How many tens have you now?

2 tens and 1 ten are —— tens, or *thirty*.

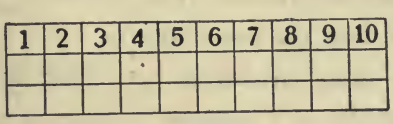
20 blocks and 10 blocks are —— blocks.

Twenty means *two tens;* what does *thirty* mean?

In 20 the figure 2 stands for *two tens*, the 0 for *no ones*.

Now who can write thirty, or *three* tens and no ones?

Let me see who can write *forty*, or *four* tens and no ones?



3 tens = 30.

79. Supply the figures needed:

One ten and no one is written thus — 10. *Ten.*
Two tens and no ones is written thus — 20. *Twenty.*
Three tens and no ones is written thus — 30. *Thirty.*
Four tens and no ones is written thus — *Forty.*
Five tens and no ones is written thus — *Fifty.*
Six tens and no ones is written thus — *Sixty.*
Seven tens and no ones is written thus — *Seventy.*
Eight tens and no ones is written thus — *Eighty.*
Nine tens and no ones is written thus — *Ninety.*
Ten tens and no ones is written thus — 100. *One hundred.*

Sixty means *six tens.* What does *seventy* mean? Eighty? Ninety?

80. Count by tens to one hundred.

How many tens make 100?

How many cents in a dollar? How many dimes?

How many tens make fifty?

How many dimes are worth 50 cents?

Six ten-cent pieces are worth —— cents.

Four dimes and three dimes are —— dimes, or —— cents.

Five tens and four tens are —— tens, or ——.

Ten tens less two tens are —— tens, or ——.

Three tens from eight tens leaves —— tens, or ——.

One-half of 6 tens is —— tens, or ——.

We gave 2 ten-dollar bills for our cow. How many dollars was that? (Twenty dollars is written thus—$20.)

This book is worth 4 dimes, or —— cents.

Dora had 10 dimes. She spent 4 of them, and had left —— dimes, or —— cents.

20
30
50

No ones and no ones are how many ones? 2 tens and 3 tens are how many tens? Then 20 + 30 = 5 tens and no ones, or 50.

81. Add:

2 dimes	20¢	4 dimes	40¢
3 dimes	30¢	4 dimes	40¢
5 dimes	50¢	2 dimes	20¢
1 dime	10¢	5 dimes	50¢
3 dimes	30¢	3 dimes	30¢
3 dimes	30¢	4 dimes	40¢
4 tens	40	5 tens	50
2 tens	20	3 tens	30

30 days	10 ft.	$40	$60
30 days	60 ft.	$50	$40
70 bushels	$50	70 yd.	20
30 bushels	$50	20 yd.	60

82. Subtract:

4 dimes	40¢	7 dimes	70¢
1 dime	10¢	1 dime	10¢
6 dimes	60¢	7 dimes	70¢
3 dimes	30¢	2 dimes	20¢
8 tens	80	10 tens	100
4 tens	40	5 tens	50
$60	80 ft.	90 pecks	$100
$20	20 ft.	80 pecks	$ 10

83. Copy and complete:

$10 + 10 = (\ )$.	$20 + 20 = (\ )$.	$50 + 30 = (\ )$.
$20 + 10 = (\ )$.	$30 + 20 = (\ )$.	$60 + 30 = (\ )$.
$30 + 10 = (\ )$.	$40 + 20 = (\ )$.	$70 + 30 = (\ )$.
$40 + 10 = (\ )$.	$50 + 20 = (\ )$.	$40 + 40 = (\ )$.
$50 + 10 = (\ )$.	$60 + 20 = (\ )$.	$50 + 40 = (\ )$.
$60 + 10 = (\ )$.	$70 + 20 = (\ )$.	$60 + 40 = (\ )$.
$70 + 10 = (\ )$.	$80 + 20 = (\ )$.	$50 + 50 = (\ )$.
$80 + 10 = (\ )$.	$30 + 30 = (\ )$.	$20 + 10 = (\ )$.
$90 + 10 = (\ )$.	$40 + 30 = (\ )$.	$30 + 10 = (\ )$.

Review and Drill.

84. Copy and add:

\$3	4 gal.	3 ft.	1 ten	10
\$1	2 gal.	4 ft.	2 tens	20
2 gal.	3 in.	4¢	4 tens	40
3 gal.	2 in.	2¢	3 tens	30
\$7	6 doz.	5 in.	8 tens	80
\$1	1 doz.	4 in.	2 tens	20

85. Copy and subtract:

7 ft.	6 doz.	5¢	6 tens	60
3 ft.	4 doz.	2¢	2 tens	20
\$8	7 in.	8 gal.	5 tens	50
\$5	4 in.	6 gal.	3 tens	30
9 yd.	\$9	10 qt.	10 tens	100
6 yd.	\$4	7 qt.	8 tens	80

86. Copy and complete:

3+2=( ).	3+4=( ).	3+6=( ).	6—2=( ).
4+1=( ).	7+1=( ).	5+4=( ).	5—3=( ).
1+5=( ).	2+6=( ).	9+1=( ).	7—5=( ).
2+4=( ).	5+3=( ).	2+8=( ).	6—4=( ).
3+3=( ).	4+4=( ).	7+3=( ).	8—5=( ).
6+1=( ).	1+8=( ).	4+6=( ).	7—3=( ).
2+5=( ).	7+2=( ).	5+5=( ).	8—6=( ).

5+( )=8.	8−3=( ).	10−2=( ).	10−( )=7.
7+( )=9.	9−2=( ).	10−7=( ).	10−( )=2.
3+( )=7.	7−4=( ).	10−4=( ).	10−( )=6.
4+( )=8.	8−3=( ).	10−5=( ).	10−( )=4.
6+( )=9.	9−7=( ).	10−6=( ).	10−( )=8.
2+( )=7.	7−5=( ).	10−8=( ).	10−( )=1.

8=2+( ).	7=2+( ).	3=7−( ).	½ of 4=( ).
6=4+( ).	9=5+( ).	2=5−( ).	¼ of 8=( ).
9=6+( ).	6=4+( ).	1=8−( ).	½ of 8=( ).
7=3+( ).	8=3+( ).	3=6−( ).	⅓ of 6=( ).
9=7+( ).	10=6+( ).	4=9−( ).	½ of 10=( ).
8=5+( ).	10=3+( ).	6=9−( ).	⅓ of 9=( ).

87. Add quickly:

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

88. Subtract quickly:

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

89. Add the number in the center to each of the other numbers in the same square. Name results at sight:

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

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

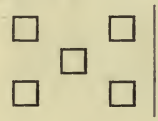
5	4	7
1	**3**	2
6	0	3

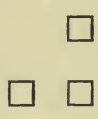
90. Subtract the number in the center from each of the other numbers in the same square. Name results quickly:

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

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

5	6	8
9	**4**	9
4	10	7





91. Rob made 5 squares and Roy made 3. How many did both make? Draw the picture.

Dick had six marbles. He gave 2 to Ned. How many had he left? Draw the picture.

There are 5 boys and 4 girls in a class. How many children?

May had 7 apples. She ate 2. How many had she left? Draw the picture.

How many feet are there in 3 yards?

How many 2-dollar bills should I get for a 10-dollar bill?

A man had ten sick sheep. One-half of them died. How many got well?

A lady sold 8 pounds of butter, 2 pounds in a roll. How many rolls?

It is 2 miles from Harry's home to school. How far does Harry walk each day? How far in two days?

Two wagons and a bicycle have how many wheels?

A farmer has 9 acres of wheat. One-third of it is cut. How much has he to cut yet? How many thirds?

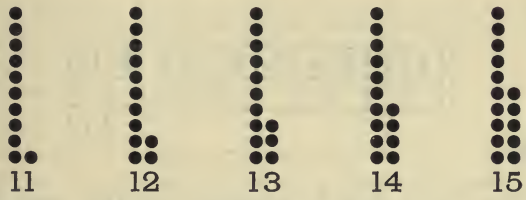
Bert has a dime. How can he give me $\frac{1}{2}$ of it?

At two cents each, what will 5 oranges cost?

If \$4 is $\frac{1}{2}$ of my money, how much have I?

Two years is $\frac{1}{4}$ of John's age. How old is he?

Writing and Reading Numbers from 1 to 100.



Eleven **Twelve** **Thirteen** **Fourteen** **Fifteen**

92. Look at the number picture on the left. What do you see over the 1 at the right in this picture? (1 *one.*)

Over the one at the left? (1 *ten.*) Then 11 means 1 *ten* and 1 *one.* (The figures 11 stand for the number *eleven.*)

What do you see over the 2 in the second number picture? (2 *ones.*) Over the 1? Then 12 means 1 *ten* and 2 *ones.* (The figures 12 stand for the number *twelve.*)

What does 13 mean? 17? 18?

How would you write *one* ten and *three* ones (*thirteen*)? One ten and *four* ones (fourteen)? One ten and five ones (fifteen)?

How many figures do you write for each number?

What does the figure on the left show?

What does the figure on the right show?

In which place do we write the *ones?* The *tens?*

If we call the number expressed by 16, *sixteen*, what shall we call the number expressed by 17? By 18? By 19?

93. Read, supplying blanks:

11 = 1 ten and 1 one.
12 = — ten and — ones.
13 = — ten and — ones.
14 = — ten and — ones.
15 = — ten and — ones.
16 = — ten and — ones.
17 = — ten and — ones.
18 = — ten and — ones.
19 = — ten and — ones.
20 = — tens (and *no* ones).

1	2	3	4	5	6	7	8	9	10	= 1 ten.
										= 1 ten.
									1	= 1 one.

94. You have already learned that two tens and no ones is written thus — 20.

Try to write two tens and *one* one.

Now write two tens and *two* ones.

What do we call 2 tens?

If we call two tens and *one* one, *twenty-one*, what shall we call two tens and *two* ones?

What shall we call two tens and *three* ones? Two tens and *four* ones? Two tens and *five* ones? Two tens and

six ones? Two tens and *seven* ones? Two tens and *eight* ones? Two tens and *nine* ones?

Copy and complete this table:*

0	10	20	30	40	50	60	70	80	90
1	11	21	31						
2	12	22							
3	13								
4									
5									
6									
7									
8									
9									

95. How many numbers are in each column?

How many columns are there?

Name the numbers in the second column, beginning at the top.

What does 16 express? (One ten and —— ones.)

What does 14 express? 18? 15?

*The pupils should be able to complete this table without help. When they have it finished, they should learn the number names—that is, count to one hundred.

Name the numbers in the third column.

What does 21 express? 23? 25? 29?

What do we call 3 tens? What then is the number made up of 3 tens and 1 *one?* (Thirty-one.)

Now name the numbers in the fourth column.

What does 31 express? 32? 36? 38?

Name the numbers in the fifth column.

What does 41 express? 43? 44? 49?

Name the numbers in each of the other columns.

Count to one hundred without looking at the table.

What number is written at the right of 14? At the left of it?

What number is written at the left of 25? At the right of it?

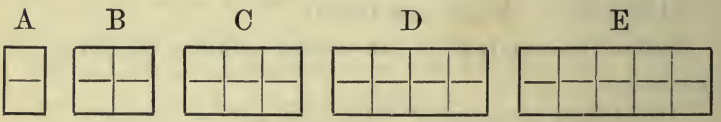
Begin at the number 2 and name each number to the right of it.

Begin with 6 and read across to 96.

Name all the numbers in the table that end in 8. In 4. In 7. In 9.

What does 99 express? Who can write 9 tens and 10 ones?

The Sign ×.



96. How many squares in A? B is how many times A? A is 2. How many 2's in B? 2 2's are ——.

$2 \times 2 = 4$. This is read, 2 2's are 4, or 2 times 2 are 4.

(The sign × stands for the word *times.*)

How many 2's in C? How many ones?

Read this: $3 \times 2 = 6$.

How many 2's in D? How many ones? How many fours?

Complete and read: $4 \times 2 = (\ )$. $2 \times 4 = (\ )$.

How many 2's in E? How many ones? How many fives?

Complete and read: $5 \times 2 = (\ )$. $2 \times 5 = (\ )$.

How many *twos* on the card to the left?

How many *threes* on the other card?

Are 3 2's as many as 2 3's?

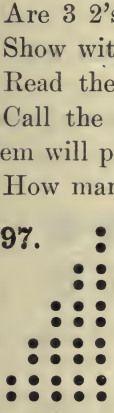
Show with blocks that your answer is correct.

Read these: $3 \times 2 = 2 \times 3$. 3×2 or $2 \times 3 = 6$.

Call the dots on the first card *cents*. How many of them will pay for a 2-cent stamp?

How many of them will pay for 3 stamps?

97.



$1 \times 2 = 2$
$2 \times 2 = 4$
$3 \times 2 = 6$
$4 \times 2 = 8$
$5 \times 2 = 10$

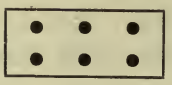
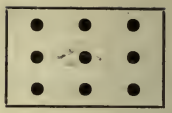
or

$2 \times 1 = 2$
$2 \times 2 = 4$
$2 \times 3 = 6$
$2 \times 4 = 8$
$2 \times 5 = 10$

How many are 2 2's? 2 4's? 2 3's? 2 5's? 2 1's? 3 2's? 5 2's? 4 2's?

Copy and complete:

$2 \times (\ ) = 4$	$2 \times (\ ) = 2$	$2 \times (\ ) = 10$
$3 \times (\ ) = 6$	$4 \times (\ ) = 8$	$5 \times (\ ) = 10$
$2 \times (\ ) = 8$	$2 \times (\ ) = 6$	$3 \times (\ ) = 9$

98. How many dots on the card at the left? How many 3's?

How many 3's do you see on the second card? On the third card?

Two 3's are how many ones? $2 \times 3 = (\ )$.

Three 3's are how many ones? $3 \times 3 = (\ )$.

Nine dots are how many times 3 dots?

Call each dot on the middle card a foot. How many of them are a yard? How many yards in 6 feet? In 9 feet?

$3 \times 2 = (\ )$. $2 \times (\ ) = 6$. $3 \times (\ ) = 9$.

An orange costs 3 cents. How much must I pay for 3 of them?

How many sides have three triangles? Three squares?

The Sign ÷.


99. Here are 6 cents. How many 2-cent stamps can I buy with them?

How many 2¢ do you see in the 6¢? How many 3¢?

How often must 2¢ be taken to make 6¢?

Then 6¢ divided by 2¢ = 3 *times*. This may be written, $6¢ \div 2¢ = 3$.

It means that 2 cents are found in 6 cents 3 times.

6¢ divided by 3¢ = ( ). $6¢ \div 3¢ = (\ )$.

What may stand for the words *divided by?*

Here are 8 stars.  To how many girls can I give 2 stars each? 4 stars each?

8 stars ÷ 2 stars = ( ). 8 stars ÷ 4 stars = ( ).

If I divide the stars into two equal parts, how many stars will be in each group?

Then 8 stars ÷ 2 = 4 *stars*. 8 stars ÷ 4 = ( ).

How many 2's in 4? In 6? In 8? In 10?

How many 3's in 6? How many in 9?

How many 4's in 8? How many 5's in 10?

How often are 4¢ contained in 8¢?

Nine quarts contains 3 quarts —— times.

4 ÷ 2 = ( ).	6 ÷ 2 = ( ).	8 ÷ 4 = ( ).
8 ÷ 2 = ( ).	6 ÷ 3 = ( ).	10 ÷ 5 = ( ).
10 ÷ 2 = ( ).	9 ÷ 3 = ( ).	8 ÷ ( ) = 4.
4¢ ÷ 2 = ( ).	$6 ÷ 3 = ( ).	8 in. ÷ 2 = ( ).
½ of 4 = ( ).	⅓ of 6 = ( ).	½ of 8 = ( ).

An orange costs 3¢. How many can I buy for 9¢?

If I must pay 5¢ for a quart of milk, how many quarts will I get for this dime?

Hettie had 9 buttons, 3 in a row. How many rows were there?

How many 2-cent tops can you buy for 8 cents?

Cut a stick 9 inches long and one 3 inches long. Compare them.

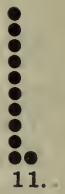
The longer stick is —— times as long as the other.

The shorter stick is —— as long as the other.

How many times can a 2-inch line be measured off on a 10-inch line?

NUMBERS TO 20.

Eleven.



100. Ten dots and one dot are —— dots.

Eleven is made up of 1 ten and —— one.

How many splints are in the bundle? How many loose splints are there?

What figure will tell the number of bundles, or *tens?* The number of single splints, or *ones?*

Take 11 pegs. Place them in two piles, putting 9 in one pile.

How many pegs in each pile? How many in both?

What is the sum of 9 pegs and 2 pegs? Of 9 and 2?

Put one peg from the larger pile on the smaller. Now how many in each pile?

The sum of 8 pegs and 3 pegs is —— pegs.

Take another peg from the larger pile and place it on the smaller. Now tell me about the two piles.

Show me with the pegs how many 6 and 5 are.

Take one peg away from the 11. How many are left?

Show me with the pegs how many 2 from 11 leaves. 3 from 11. 4 from 11. 5 from 11. 6 from 11. 7 from 11.

Cut a string a foot long. Cut off 1 inch of it. Measure the piece that is left.

Mary may tell us all she can about 11.

101. Copy and complete:

$10 + 1 =$	$11 - 1 =$	$11 - 6 =$	$11 - (\ ) = 8$
$9 + 2 =$	$11 - 2 =$	$11 - 8 =$	$7 + (\ ) = 11$
$3 + 8 =$	$11 - 4 =$	$11 - 7 =$	$4 + (\ ) = 11$
$7 + 4 =$	$11 - 3 =$	$11 - 9 =$	$11 - (\ ) = 6$
$5 + 6 =$	$11 - 5 =$	$11 - 10 =$	$11 - (\ ) = 4$

102. Make a story for $5 + 6$.

A stick of candy costs a cent. How many sticks can you get for a dime and a cent?

What two pieces of money make 11 cents?

How much must you pay for three 3-cent stamps and a 2-cent stamp?

If you have been at school two weeks and one day this month, how many days have you been at school?

Three yards and two feet are how many feet?

We have 2 bushels and 3 pecks of apples. How many pecks have we?

If we use 3 pecks of them, how many pecks will we have left? How many bushels?

A rail 11 feet long was cut in two. One part was 7 feet long. What was the length of the other part?

There are 11 eggs in two nests. In one nest there are 5 eggs. How many in the other?

Twelve.

103. Ten dots and 2 dots are —— dots.

Twelve dots are 1 more than —— dots.

There are 12 dots on the card at the right. Call them pigs. How many are in each pen?

Six and six, or two sixes, are ——. How many 6's in 12?

Put one little pig into the pen with the big ones. How many pigs in each pen now?

Seven and five are how many?

Put another little pig in with the big ones. Now how many pigs in each pen?

Eight and four are how many?

When 9 of them are in one pen, how many are in the other?

When only two little pigs remain in one pen, how many are in the other?

Who can name three numbers that added together make 12?

Write twelve and tell what each figure stands for.

Use your foot rule to find these answers:

One inch from 12 inches leaves —— inches.
Two inches from 12 inches leaves —— inches.
Four inches from 12 inches leaves —— inches.
Eight inches from 12 inches leaves —— inches.
Three inches from 12 inches leaves —— inches.
Five inches from 12 inches leaves —— inches.
Six inches from 12 inches leaves —— inches.

How many triangles can you make with 12 splints? How many squares?

Measure your rule with a stick 2 inches long. How many 2-inches make 12 inches?

$$6 \times 2 \text{ inches} = \text{——} \text{ inches.}$$

How many times could you cut 2 inches off your rule? How many 2's in 12?

12 inches ÷ 2 inches = ——.

Use splints to show me $\frac{1}{2}$ of 12. $\frac{1}{3}$ of 12. $\frac{2}{3}$ of 12.

104. Measure with the foot rule:

The length of this book.
The width of your desk.
The length of this chart.
The height of this boy.
The length of this yardstick.

Measure with the yardstick:

The length of this room.
The width of this room.
The length of this house.

Your foot rule is marked off into 12 equal parts. What is each part called?

In 1 foot there are —— inches. In $\frac{1}{2}$ of a foot there are —— inches.

How many inches in $\frac{1}{3}$ of a foot? In $\frac{1}{4}$ of a foot?

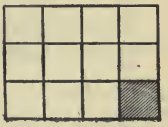
Draw a line on the board 12 inches long, without measuring.

Now measure it and find out how long it really is.

Who can draw a line a yard long without measuring it?

Draw a rectangle (an oblong) four inches long and three inches wide.

Draw lines across it, as in the picture. Draw them an inch apart.



What is a square 1 inch on a side called?

How many square inches are there in the upper row?

How many rows are there? Then how many square inches in the three rows?

3×4 square inches = —— square inches.

How many square inches in the left-hand row? How many rows are there?

Then how many square inches in the four rows?

4×3 square inches = —— square inches.

Cut out a square inch and find how many of them will cover your rectangle.

Draw a rectangle 6 inches long and 2 inches wide. Find how many square inches there are in it.

105. Copy and complete:

$10 + 2 =$	$12 - 2 =$	$12 - (\ ) = 2$	$9 + 2 =$
$11 + 1 =$	$12 - 1 =$	$12 - (\ ) = 4$	$7 + 4 =$
$9 + 3 =$	$12 - 4 =$	$12 - (\ ) = 3$	$\frac{1}{4}$ of $12 =$
$4 + 8 =$	$12 - 3 =$	$12 - (\ ) = 5$	$\frac{2}{4}$ of $12 =$
$7 + 5 =$	$12 - 5 =$	$12 - (\ ) = 7$	$\frac{3}{4}$ of $12 =$
$6 + 6 =$	$12 - 6 =$	$12 - (\ ) = 8$	$\frac{1}{3}$ of $9 =$
$2 \times 6 =$	$12 \div 2 =$	$12 \div 3 =$	$\frac{1}{3}$ of $12 =$
$3 \times 4 =$	$12 \div 6 =$	$12 \div 4 =$	$\frac{2}{3}$ of $12 =$

106. There are 9 quarts of milk in one pail and 3 quarts in another. How much milk?

Tell a story about $8 + 4 = 12$.

How many days are a week and 5 days?

Seven cents and a nickel are how much money?

Henry had 12 goats. A bad boy stole 4 of them. Ask a question and answer it.

Make a story about $12 - 5 = 7$.

A boy who had 12 cents gave two nickels for a book. He had left —— cents.

How many cows have 12 tails? How many have 12 horns?

Six girls wear —— shoes.

How many shoes do 3 horses wear?

In 1 yard there are —— feet. In 4 yards there are —— feet.

Twelve pecks of plums are how many bushels?

A log is 12 feet long. How many yards is that?

If you divide 12 nuts equally among 4 boys, how many will each have?

How many quarts of milk in 12 pints?

If we had a dozen eggs, —— boys could have 2 apiece.

107. Name the months of the year.

In a year there are —— months. In half a year there are —— months.

What is the first month? The second? The twelfth?

What is the name of the present month? In what month is your birthday?

During what months is school held?

March, April, and May are called the spring months. Name the summer months. The fall or autumn months. The winter months.

How many seasons in a year? Then how many months in a season?

What part of a year are the spring months? The summer months?

What part of a year are the spring and summer months together?

108. Some things to remember:

Jan. stands for January.	Sept. stands for September.
Feb. stands for February.	Oct. stands for October.
Mar. stands for March.	Nov. stands for November.
Aug. stands for August.	Dec. stands for December.

12 *inches make* 1 *foot.*	In. stands for *inch* or *inches.*
12 *things make* 1 *dozen.*	Ft. stands for *foot* or *feet.*
12 *months make* 1 *year.*	Doz. stands for *dozen.*

Ct. or ¢ stands for *cent.*	Sq. in. stands for *square inch.*
Qt. stands for *quart.*	Yd. stands for *yard.*
Gal. stands for *gallon.*	Bu. stands for *bushel.*

109. It is noon at 12 o'clock. Look at the clock face and tell how many hours it is from noon to midnight.

Show me to what the short hand points at 1 o'clock. At 2 o'clock.

What stands for *one* on the clock face? For *two?* For *three?* For *five?* For *ten?*

I stands for 1.	V stands for 5.
II stands for 2.	X stands for 10.
III stands for 3.	What stands for 4?

In Roman notation IV always stands for 4 except on clock faces, where IIII is commonly used.

You know that 5 — 1 means 4, or 1 less than 5. When I is written *before* V, the two letters (IV) mean *one less than five*, or 4.

What do you think IX means?

What does 5 + 1 mean?

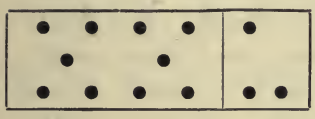
When I is written *after* V, the two letters (VI) mean *one more than five*, or 6.

What do you think VII means? VIII? XI? XII?

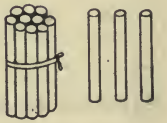
IV stands for 4.	X stands for 10.
VI stands for 6.	IX stands for 9.
VII stands for 7.	XI stands for 11.
VIII stands for 8.	XII stands for 12.

If we eat dinner at 12 o'clock and supper at 6 o'clock, how long is it between meals?

Look at a nickel to-night and tell me to-morrow what shows the number of cents it is worth.



Thirteen.



110. What number follows 12?

One ten and 3 ones are ——.

Name two numbers less than 10 whose sum is 13. Two other numbers. Now two others. (Use splints to find the numbers.)

Take 13 splints. Show how many are left when 4 are taken away. When 5 are taken away. When 6 are taken away.

This line on the board is 13 inches long. How much longer is it than your foot rule?

How many splints are in the bundle? How many *tens?* How many loose splints, or *ones*, do you see?

Write on the board the figures that stand for the number *thirteen*.

Which figure stands for the tens? Which for the ones?

Three and *ten* are ——. (The word *thirteen* means *three* and *ten*.)

111. Copy and complete:

$10 + 3 =$	$13 - 4 =$	$11 + 2 =$	$8 + 2 + 3 =$
$9 + 4 =$	$13 - 6 =$	$13 - (\ ) = 9$	$5 + 4 + 4 =$
$5 + 8 =$	$13 - 7 =$	$13 - (\ ) = 7$	$4 + 3 + 6 =$
$7 + 6 =$	$13 - 5 =$	$13 - (\ ) = 5$	$5 + 3 + 5 =$

112. Add quickly:

7	9	5	3	2	6	7	8	4	6
6	4	8	10	11	5	5	3	5	4

Subtract at sight:

13	13	13	13	13	13	13	12	12	12
4	6	5	7	8	9	10	3	5	4

Subtract each number in the rim of the wheel from the 13 in the center.

113. Three bushels and a peck are how many pecks?

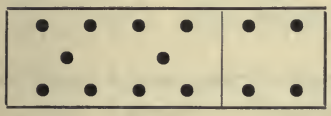
There are 8 qt. of milk in one pail and 5 qt. in another. How much milk in both?

Look at the flag and tell a story about $7 + 6$.

How many 4's in 13, and how many left over? Draw the picture, using dots.

A log is 4 yd. and 1 ft. long. It is —— feet longer than a pole ten feet long.

Fourteen.



114. One ten and 4 ones are ——.

How many squares do you see in the figure?

How many more than 10? How many more than 9? Than 8? Than 7?

If 5 were taken away, how many would be left?

Take six away from 14. How many remain?

Count by twos to 14.

How many dots are in each row? How many rows?

Two times 7 dots are —— dots.

Show that 7 times 2 dots are as many as 2×7 dots.

One-half of 14 dots is —— dots.

How many 7's make 14? How many 2's?

Take 9 splints and 5 splints and show that they are as many as one ten and four ones.

Write the figures that stand for the number *fourteen.*

Which figure stands for the *ones?* On which side of the 1 must it stand?

115. Copy and complete:

$9 + 5 =$	$14 - 6 =$	$5 + (\ ) = 14$	$2 \times 7 =$
$6 + 8 =$	$14 - 7 =$	$8 + (\ ) = 14$	$7 \times 2 =$
$7 + 7 =$	$14 - 8 =$	$14 - (\ ) = 9$	$14 \div 2 =$
$14 - 5 =$	$14 - 9 =$	$14 - (\ ) = 6$	$14 \div 7 =$

2 qt. + 1 pt. = —— pt.	3 ga.. + 2 qt. = —— qt.
7 bu. + 3 bu. = ——	\$10 + \$4 =
1 ft. + 2 in. = —— in.	5 qt. + 3 pt. = —— pt.
3 yd. + 5 ft. = —— ft.	$\frac{1}{2}$ doz. + 5 =

116. James earned 8 cents on Friday and 6 cents on Saturday. On both days he earned —— cents.

How much will 6 eggs cost at 14 cents a dozen?

In 14 there are —— 3's and —— over.

Make a story for $7 + 7 = 14$.

How many days are there in two weeks?

How many gloves are 7 pairs of gloves?

Fourteen months are how many more months than a year?

A boy had a ten-cent piece and four pennies. He spent 5 cents for peanuts. How much had he left?

A spider has 8 legs. A spider and a fly together have 14 legs. How many legs has a fly?

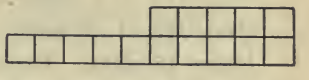
Three gallons and 2 quarts of milk are how many quarts?

How many half-bushels of oats make 7 bushels?

If a milkman has 7 qt. of milk, to how many persons can he sell a pint each?

A man has 14 miles to travel. When he has gone 8 miles, how far has he yet to go?

Fifteen.



117. One ten and 5 ones, or one ten and 1 five, are ——.

Lay 10 blocks in one row and 5 in another, as in the picture above. Use them to find the missing number in the following:

15=9+( ). 15= 8+( ). 15=6+( ). 15=7+( ).
15—6=( ). 15— 8=( ). 15—7=( ). 15—9=( ).
15=3×( ). 15= 5×( ). 15÷5=( ). 15÷3=( ).

How many dots are on the card? What part of them are on the right of the line? On the left of the line?

Are 3 fives as many as 5 threes? Show with counters.

118. This circle is divided into —— equal parts. What do you think one of these parts is called?

What part of the rectangle is dark?

One of the 5 equal parts of anything is called *one-fifth* ($\frac{1}{5}$).

To find one-fifth of anything we must divide it into —— equal parts.

How many small squares are there in the rectangle?

Are the 3 dark squares one of the 5 equal parts of the rectangle?

Then $\frac{1}{5}$ of 15 squares is —— squares.

One-fifth of 5 cents is —— cent.

One-fifth of 10 feet is —— feet.

Make 15 dots. Draw a line around $\frac{1}{5}$ of them. Now draw a line around another fifth of them.

How many fifths have lines around them? How many fifths have no lines around them?

How many dots in one fifth? How many in two fifths?

Then $\frac{2}{5}$ of 15 dots = —— dots.

119. Copy and complete:

9+6=	15—6=	7+( )=15.	3×5=
7+8=	15—7=	9+( )=15.	5×3=
$\frac{1}{3}$ of 15=	15—9=	15—( )=10.	15÷5=
$\frac{2}{3}$ of 15=	15—8=	15—( )= 6.	15÷3=
$\frac{1}{5}$ of 15=	$\frac{2}{5}$ of 15=	$\frac{3}{5}$ of 15=	$\frac{4}{5}$ of 15=

120. A man has 3 five-dollar bills. How much money has he?

What two pieces of paper money make $15? What 3 pieces?

Fifteen eggs are how many more than a dozen?

Tell a story about 9 boys + 6 girls = 15 children.

Punch has 8 dimes and Judy 7. Ask a question and answer it.

Jennie has 5 yd. of cloth for a dress. How many feet long is the cloth?

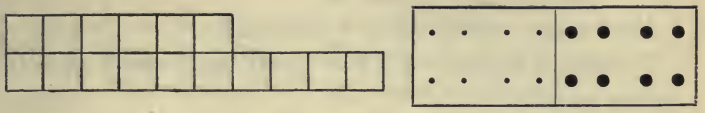
Tell a story about 15 — 6 = 9.

Stella had 15 jacks. She lost 7 of them. She had —— left.

Harry may tell all he can about 15.

Find out at home to-night how many *ounces* make a *pound.*

Sixteen.



121. One ten and six ones are ——.

Show with blocks how many 9 and 7 are.

How many ones do you see on the card? How many 8's? How many 4's? How many 2's?

Show with blocks how many 16 — 7 are.

How many times 4 dots make 16 dots?

How often does the card contain 8 dots?

If the dots were shoes, how many pairs could you take?

If they were quarts, how many gallons would you have?

What part of the dots is on each side of the line?

What part of the 16 dots are large?

How many fourths of them are small?

Sixteen means *six* and ——.

122. Copy and complete:

$9 + 7 =$	$\frac{1}{4}$ of $16 =$	$2 \times 8 =$	$16 \div 8 =$
$8 + 8 =$	$\frac{3}{4}$ of $16 =$	$8 \times 2 =$	$16 \div 2 =$
$10 + 6 =$	$\frac{1}{2}$ of $16 =$	$4 \times 4 =$	$16 \div 4 =$

123. Tom had 9 cents and Sam had 7 cents. They both had —— cents.

They gave ten cents of it for a dime. How many pennies had they left?

Cora carried 2 gallons of water and Della carried 8 quarts. How much did both carry?

We have 4 cows. Each cow gives 4 quarts of milk. They all give —— quarts.

Mr. Brown had 16 sheep, but one-half of them died. Ask a question and answer it.

How many wheels have 8 bicycles?

I have 16 apples. To how many girls can I give two apples each?

124. Where have you seen these weights used?

Which is the largest weight? The smallest?

How many of the smallest are equal to the largest?

How many ounces make a pound?

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

What stands for the word *ounce* or *ounces?* For the word *pound* or *pounds?*

How many ounces in $\frac{1}{2}$ of a pound? In $\frac{1}{4}$ of a pound?

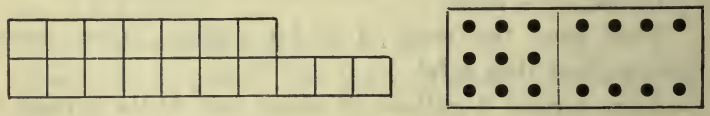
What part of a pound are 8 ounces? 4 ounces?

How many ounces in a quarter of a pound of starch?

How many 4-ounce weights are equal to the 1-pound weight? How many 2-ounce weights?

When butter is 16 cents a pound, how much must I pay for 8 ounces? For 4 ounces? For 12 ounces, or $\frac{3}{4}$ of a pound?

Seventeen.



125. Ten and seven are how many? How many more would make 2 tens?

What does the word *seventeen* mean?

How many dots are on the card? How many on each end of it?

Nine dots and eight dots are —— dots.

If 8 dots were taken off the card, how many would remain? How many if 9 dots were removed?

Count 12 by *twos*. What other numbers can you count by twos? Can you count 9 by twos?

Numbers that can be counted by twos are called **even** numbers; all others are called **odd** numbers.

Did you ever play "Odd or Even"? How do you play it?

Is 5 *odd* or *even?*

Name all the odd numbers less than 17.

Tell at sight what number put with each of the outer numbers will make 17.

10	8	14
12	**17**	7
15	11	9

126. Add:

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

Subtract:

17	17	17	16	16	16	16	15
8	10	9	8	9	6	7	6
—	—	—	—	—	—	—	—

127. Is 9 odd or even? How many 2's in 9?

$9 \div 2 =$ —— and —— left over.

$7 \div 2 =$ —— and —— left over.

$13 \div 4 =$ —— and —— left over.

$14 \div 5 =$ —— and —— left over.

$17 \div 4 =$ —— and —— left over.

$17 \div 5 =$ —— and —— left over.

128. Nine cents + eight cents = 1 dime + —— cents.

Five yards and 2 feet are how many feet?

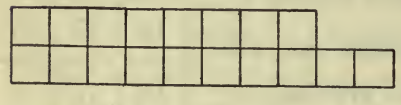
My brother is 17 years old. How old was he 8 years ago?

If sugar is 5¢ a pound, how many pounds can you buy with a dime and a nickel?

A string 17 ft. long was cut in two in the middle. What was the length of each part? Find by measuring.

How many gallons of oil at 8 cents a gallon can you buy with 17 cents? How many cents left over?

Eighteen.



129. Ten and eight, or 1 ten and 8 ones, are ——.

Nine dots and nine dots are how many dots?

If nine dots are taken from 18 dots, how many will remain?

How many small dots are on the card? How many sixes do you see on it? How many threes? How many nines?

Find how many twos make eighteen.

One-half of 18 dots is —— dots.

One-third of 18 dots is —— dots.

Two-thirds of 18 dots are —— dots.

Make dots for the following: 18, 6, 12, 9, $\frac{1}{3}$ of 18.

Count to 18 by 2's. By 3's. By 6's.

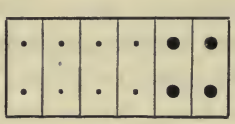
Is 18 an even or an odd number?

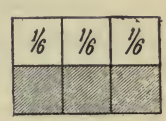
How many 2's in 18? How many 3's? How many 6's?

How many 9's can you take from 18? Then how many 9's are in 18?

Take 18 sticks and find how many 8's in 18, and how many left over.

What part of 18 is 9? What part of 18 is 6?





130. The circle is divided into —— equal parts. Show me one-sixth ($\frac{1}{6}$) of the circle.

To find $\frac{1}{6}$ of anything we must divide it into —— equal parts.

Show me $\frac{1}{6}$ of the dots on the card.

$\frac{1}{6}$ of 12 dots = —— dots.

How many sixths of the dots are large?

$\frac{2}{6}$ of 12 dots = —— dots.

$\frac{3}{6}$ of 12 dots = —— dots.

Is $\frac{1}{2}$ of the rectangle as much as $\frac{3}{6}$ of it?

Is $\frac{1}{2}$ of 12 dots as many as $\frac{3}{6}$ of them?

Find $\frac{1}{3}$ of 12 dots and compare it with $\frac{2}{6}$ of them.

Which is larger, $\frac{1}{3}$ of 12 or $\frac{1}{6}$ of 12?

Show me $\frac{1}{6}$ of 18 blocks. $\frac{1}{6}$ of 18 =

What part of 12 is 2? Of 6 is 1?

131. Copy and complete:

$9 + 9 =$	$9 \times 2 =$	$18 \div 6 =$	$18 - (\ ) = 9$
$2 \times 9 =$	$18 \div 3 =$	$18 \div 9 =$	$8 + 8 + 2 =$
$18 - 9 =$	$18 \div 2 =$	$3 \times 6 =$	$6 \times (\ ) = 18$

$3 + 5 + 10 =$	$\frac{1}{2}$ of 18 =	$\frac{2}{6}$ of 18 =
$2 + 7 + 4 =$	$\frac{1}{3}$ of 18 =	$\frac{5}{6}$ of 18 =
$4 + 4 + 6 =$	$\frac{2}{3}$ of 18 =	$\frac{3}{6} + \frac{1}{6} =$
$2 + 9 + 5 =$	$\frac{1}{6}$ of 18 =	$\frac{6}{6} - \frac{1}{6} =$

132. A boy bought 2 books at 9 cents apiece. They cost him —— cents.

Barnet put 18 nuts on a fence. A squirrel carried off 2 of them each day for —— days. Then all were gone.

How many days are 2 weeks and 4 days?

Four bushels and 2 pecks, or $4\frac{1}{2}$ bu., are —— pecks.

Draw a line 18 in. long. Show that it is —— ft. long.

Mary sold eggs at a cent apiece. How much did she get for a dozen and a half?

Find the cost of a gallon of milk at 4¢ a quart.

If 1 orange costs 2 cents, what will 9 oranges cost?

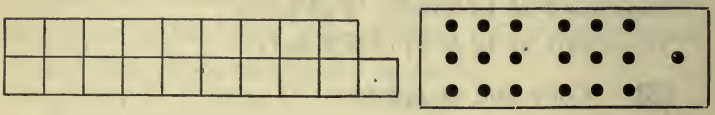
How many yards in a piece of cloth 18 feet long?

I want to buy a book for 18 cents. I have a dime. I need —— cents more.

Maud has 18 jacks. She gave $\frac{1}{2}$ of them to Jane. How many had she left?

How many squares can you make with 18 splints? How many triangles?

Nineteen.



133. One ten and 9 ones, or 10 and 9, are ——.

How many dots are 2×9 dots, and 1 dot?

How many dots are 6×3 dots, and 1 dot?

Nineteen dots are how many more than 3×6 dots?

How many tens in 19? How many ones left over?

How many 2's in 19, and how many ones left over?

How many 9's in 19, and how many left over?

Show that 10 is —— less than 19.
Nineteen is how many more than 11?
Show that 12 and —— are 19.
Show that 19 is —— more than 13.
To each of the following add the number that will make the sum 19: 8, 11, 7, 9, 15, 17, 16.

134. Copy and complete:

$10 + 9 =$	$9 + 9 + 1 =$	$8 + 8 + 3 =$
$19 - 9 =$	$2 \times 9 + 1 =$	$2 \times 8 + 3 =$
$19 \div 10 =$	$19 \div 9 \quad =$	$19 \div 8 \quad =$

Review and Drill.

135.

a	*b*	*c*
$11 + 1 =$	$12 + 2 =$	$13 + 3 =$
$11 + 3 =$	$12 + 4 =$	$13 + 5 =$
$11 + 2 =$	$12 + 6 =$	$13 + 6 =$
$11 + 5 =$	$12 + 3 =$	$14 + 5 =$
$11 + 4 =$	$12 + 5 =$	$14 + 4 =$
$11 + 7 =$	$12 + 7 =$	$14 + 2 =$
$11 + 6 =$	$13 + 2 =$	$14 + 3 =$
$11 + 8 =$	$13 + 4 =$	$15 + 2 =$

d	*e*	*f*
$15 + 3 =$	$9 + 3 =$	$8 + 9 =$
$15 + 4 =$	$9 + 5 =$	$9 + 9 =$
$16 + 3 =$	$9 + 4 =$	$8 + 5 =$
$16 + 2 =$	$9 + 6 =$	$8 + 8 =$
$17 + 2 =$	$9 + 7 =$	$8 + 4 =$

g	*h*	*i*
8 + 3 =	6 + 2 =	5 + 5 =
8 + 7 =	6 + 4 =	4 + 4 =
8 + 8 =	6 + 6 =	4 + 2 =
7 + 4 =	6 + 3 =	4 + 3 =
7 + 6 =	6 + 5 =	3 + 4 =
7 + 5 =	5 + 4 =	3 + 2 =
7 + 3 =	5 + 2 =	7 + 9 =
7 + 7 =	5 + 3 =	8 + 7 =

j	*k*	*l*	*m*
2 × 2 =	2 × 8 =	3 × 5 =	5 × 3 =
2 × 3 =	2 × 9 =	3 × 6 =	6 × 2 =
2 × 4 =	2 × 10 =	4 × 2 =	6 × 3 =
2 × 5 =	3 × 2 =	4 × 3 =	7 × 2 =
2 × 6 =	3 × 3 =	4 × 4 =	8 × 2 =
2 × 7 =	3 × 4 =	5 × 2 =	9 × 2 =

n	*o*	*p*	*q*
9 − 2 =	8 − 2 =	7 − 5 =	10 − 2 =
9 − 7 =	8 − 6 =	7 − 3 =	10 − 8 =
9 − 3 =	8 − 3 =	7 − 4 =	10 − 3 =
9 − 6 =	8 − 5 =	6 − 2 =	10 − 7 =
9 − 4 =	8 − 4 =	6 − 4 =	10 − 4 =
9 − 5 =	7 − 2 =	6 − 3 =	10 − 6 =

r	*s*	*t*	*u*
10 − 5 =	12 − 2 =	13 − 2 =	14 − 2 =
11 − 2 =	12 − 10 =	13 − 11 =	14 − 3 =
11 − 9 =	12 − 3 =	13 − 3 =	14 − 4 =
11 − 3 =	12 − 9 =	13 − 4 =	14 − 5 =
11 − 8 =	12 − 4 =	13 − 9 =	14 − 9 =
11 − 4 =	12 − 8 =	13 − 5 =	14 − 6 =
11 − 7 =	12 − 5 =	13 − 8 =	14 − 8 =
11 − 5 =	12 − 7 =	13 − 6 =	14 − 7 =
11 − 6 =	12 − 6 =	13 − 7 =	14 − 10 =

v	*w*	*x*	*y*
$4 \div 2 =$	$14 \div 2 =$	$12 \div 6 =$	$18 \div 3 =$
$9 \div 2 =$	$16 \div 2 =$	$18 \div 6 =$	$10 \div 5 =$
$6 \div 2 =$	$18 \div 2 =$	$6 \div 3 =$	$15 \div 5 =$
$8 \div 2 =$	$4 \div 4 =$	$9 \div 3 =$	$12 \div 6 =$
$10 \div 2 =$	$8 \div 4 =$	$12 \div 3 =$	$18 \div 6 =$
$12 \div 2 =$	$12 \div 4 =$	$15 \div 3 =$	$14 \div 7 =$

136. A farmer has 7 Jersey cows and 8 Durham cows. How many cows has he?

Willie caught 1 trout and Harry caught 9 trout. How many did both catch?

School begins at 9 o'clock in the morning, and continues 3 hours. What time is it when school is dismissed?

In a game of baseball 9 persons play on each side. How many players are there in the game?

A table is 6 feet long and 3 feet wide. What is the number of feet around it?

From a dozen and a half cans of peaches 3 cans were used. How many cans were left?

A farmer had 19 lambs and sold 7 of them. How many lambs had he left?

One sash of a window has 2 rows of panes, and 3 panes in a row. How many panes are there in the sash?

Hunter has 8 rabbits; Jack has half as many. How many rabbits have both together?

How many legs have 6 three-legged stools?

From a brood of 19 chickens, 6 were sold, and half a dozen were eaten. How many chickens were left?

How many times does the sun rise and set in 1 week?

Divide 18 peaches among 6 girls. How many peaches does each receive?

A plank is 18 inches long. If you saw off a half foot, how long is the plank then?

Make a rectangle 5 inches long and 3 inches wide, and divide it into inch squares. How many square inches in the rectangle?

How many quart bottles will it take to hold 16 pints?

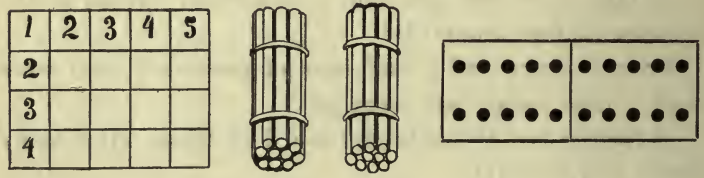
If you have $\frac{3}{4}$ of a dollar and spend $\frac{1}{4}$, how many fourths have you left? How many quarters?

Nineteen ounces are how many more ounces than one pound?

Draw a line 17 inches long. How many more inches long is it than 1 foot?

How many strokes will a clock make in striking 8 and 9?

Twenty.



137. Ten and ten, or two tens, are ——.

How many squares in the upper row? How many rows are there? How many squares in all the rows?

Then 4 times 5 squares are —— squares.

Show that 5 times 4 squares are 20 squares.

Two tens are as many as —— fives or —— fours.

Find from the card how many twos in twenty.

What does the figure 0 mean in the number 20?

What figure shows that there are two 10's in twenty?

Show that 20 is —— more than 10.

Show that 16 is —— less than 20.

Show that —— is 5 less than 20.

One-half of 20 dots is —— dots.

Two dots are found in 20 dots —— times.

One-fourth of 20 squares is —— squares.

Two-fourths of 20 squares are —— squares.

Three-fourths of 20 squares are —— squares.

138. One-half of anything is one of its two equal parts.

One-third of anything is one of its —— equal parts.

What is meant by $\frac{1}{4}$ of anything? $\frac{1}{5}$?

Divide 10 blocks into 10 equal parts. How many blocks in each part?

What is one of the equal parts called? (One-tenth.)

One-tenth of 10 blocks is —— block.

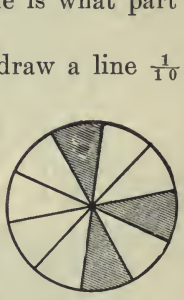
How many ones make one ten? Then one *one* is what part of one *ten?*

Show me one-tenth ($\frac{1}{10}$) of 20 dots.

One cent is what part of 10 cents? One is what part of 10?

Draw a line 10 inches long. Under it draw a line $\frac{1}{10}$ as long.

Into how many equal parts is this circle divided?



What is each part called?

How many tenths are dark? How many are light?

$\frac{3}{10}$ of the circle + $\frac{7}{10}$ of the circle = —— of the circle, or the whole circle.

How many tenths are $\frac{1}{10}$ and $\frac{2}{10}$?

Make two rows of 10 dots each. Draw a ring around $\frac{1}{10}$ of the dots. Draw a ring around $\frac{1}{5}$ of the 20 dots.

Which is more, $\frac{1}{5}$ of 20 dots or $\frac{2}{10}$ of 20 dots?

If you take $\frac{3}{10}$ of anything away, how many tenths remain?

One of the ten equal parts of anything is called *one-tenth.*

What are 3 of the parts called? Four of the parts? Seven of the parts?

How many tenths are there in anything? How many halves? Show that $\frac{1}{2} = \frac{5}{10}$.

One tenth means *one* out of *ten.* What does $\frac{2}{10}$ mean? $\frac{5}{10}$? $\frac{10}{10}$?

How many dimes make a dollar? A dime is what part of a dollar?

What part of a dollar are 3 dimes? 5 dimes?

Is one half-dollar as much as 5 dimes?

Is one-half as much as 5 tenths?

Twenty things are sometimes called a *score.* How many things in half a score? In $\frac{1}{10}$ of a score?

139. Complete the process:

$10 + 10 =$	$20 - 10 =$	$20 = 10 +$
$18 + 2 =$	$20 - 2 =$	$20 = 18 +$
$16 + 4 =$	$20 - 4 =$	$20 = 16 +$
$17 + 3 =$	$20 - 3 =$	$20 = 17 +$
$15 + 5 =$	$20 - 5 =$	$20 = 15 +$
$14 + 6 =$	$20 - 6 =$	$20 = 14 +$
$12 + 8 =$	$20 - 8 =$	$20 = 12 +$
$13 + 7 =$	$20 - 7 =$	$20 = 13 +$
$2 \times 10 =$	$20 \div 10 =$	$\frac{1}{2}$ of $20 =$
$10 \times 2 =$	$20 \div 2 =$	$\frac{1}{4}$ of $20 =$
$4 \times 5 =$	$20 \div 5 =$	$\frac{1}{5}$ of $20 =$
$5 \times 4 =$	$20 \div 4 =$	$\frac{1}{10}$ of $20 =$

140. 10 is contained in 20 —— times and —— over.
9 is contained in 20 —— times and —— over.
8 is contained in 20 —— times and —— over.
7 is contained in 20 —— times and —— over.
6 is contained in 20 —— times and —— over.
5 is contained in 20 —— times and —— over.
3 is contained in 20 —— times and —— over.
4 is contained in 20 —— times and —— over.
2 is contained in 20 —— times and —— over.

141. Count by fives to 20. —— fives are 20.
Count by twos to 20. —— twos are 20.
Count by fours to 20. —— fours are 20.
Count by threes to 18. —— threes and 2 are 20.
Count by sixes to 18. —— sixes and 2 are 20.
Count by tens to 100. —— tens are 100.

142. How many shoes will be required to shoe 5 horses? 10 men?

If you had 10 cents and your mother gave you a ten-cent piece, how much money would you have?

A farmer owns 3 horses, 8 cows, and 9 sheep. How many animals has he?

If a strip of paper is 5 inches long and 4 inches wide, how many square inches does it contain?

Two dimes equal how many nickels?

If 20 bananas were divided equally among 4 girls, how many would each have?

If a strip of paper contains 20 square inches, and it is 5 inches long, how wide is it?

Marvin had 20 cents and spent $\frac{1}{5}$ of them for ink, and the rest for paper. What did the paper cost?

How many school days in 4 weeks?

If I cut 5 apples into quarters, to how many children can I give a piece?

Is 20 odd or even? How much must you add to it to make it odd?

Take 20 cents and give $\frac{1}{10}$ of them to each of 5 of your classmates. How many have you left?

Draw 11 vertical lines 2 inches apart on the blackboard. How far apart are the two outside lines?

Harry had 20 marbles. He put $\frac{1}{4}$ of them into one pile, $\frac{1}{5}$ of them into another pile, and the rest in the third pile. How many in each pile?

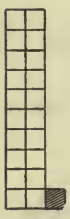
Eggs are 10¢ a dozen. How many dozen can be bought for 20¢?

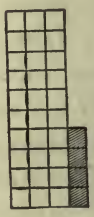
We have found out that X stands for 10. What do you think XX stands for?

How many years are 3 score years?

How old is a man who is 3 score and ten years of age?

Numbers to 100.





10+10+1=21. 10+10+5=25. 10+10+10=30. 10+10+10+4=34.
$2t+1o=21o$. $2t+5o=25o$. $3t=30o$. $3t+4o=34o$.

143. Here t stands for the *tens*. What does o stand for?

Draw squares like these to represent 23, 27, 36, 39.

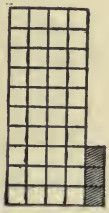
Draw squares to represent $2t+6o$, $3t+8o$, $2t+2t$.

Complete:

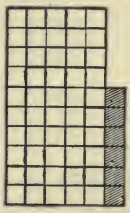
$20 + 1 = 21$	$20 + 8 =$	$25 = 2\,t + 5\,o$
$2\,t + 1o = 21o$	$2\,t + 8o =$	$22 =$
$20 + 2 =$	$30 + 1 =$	$26 =$
$2\,t + 2o =$	$3\,t + 1o =$	$29 =$
$20 + 4 =$	$30 + 3 =$	$32 =$
$2\,t + 4o =$	$3\,t + 3o =$	$36 =$
$20 + 6 =$	$30 + 5 =$	$37 =$
$2\,t + 6o =$	$3\,t + 5o =$	$39 =$

$5\,t + 3\,t = 8\,t = 80$ $\quad 6\,o + 5\,o = 11o = 1t + 1o$, or 11

$4\,t + 5\,t =$	$7\,o + 6\,o =$
$3\,t + 4\,t =$	$9\,o + 6\,o =$
$7\,t + 2\,t =$	$12\,o + 8\,o =$
$6\,t + 4\,t =$	$20\,o + 7\,o =$



10+10+10+10+3=43.
$4\,t + 3\,o = 43\,o$.



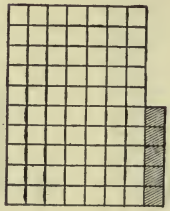
10+10+10+10+10+6=56.
$5t + 6\,o = 56\,o$.

144. Draw squares to represent 45, 57, 52, 64, 66. Draw squares to represent $4\,t + 6\,o$, $5\,t + 8\,o$, $6\,t + 1\,t$.

Complete:

$40 + 1 = 41$	$4\,t + 1\,o = 41\,o$	$41 = 4\,t + 1\,o$
$40 + 4 =$	$4\,t + 4\,o =$	$44 =$
$40 + 8 =$	$4\,t + 8\,o =$	$48 =$
$50 + 0 =$	$5\,t + 0\,o =$	$50 =$
$50 + 5 =$	$5\,t + 5\,o =$	$55 =$
$50 + 9 =$	$5\,t + 9\,o =$	$59 =$
$60 + 3 =$	$6\,t + 3\,o =$	$63 =$
$60 + 8 =$	$6\,t + 8\,o =$	$68 =$

$42 = 4\,t + 2o$	$18\,o + 3\,o = 21\,o = 2\,t + 1\,o$, or 21
$45 =$	$14\,o + 4\,o =$
$47 =$	$15\,o + 5\,o =$
$53 =$	$20\,o + 4\,o =$
$56 =$	$30\,o + 2\,o =$
$58 =$	$40\,o + 7\,o =$
$64 =$	$50\,o + 4\,o =$
$67 =$	$60\,o + 5\,o =$



$10+10+10+10+10+10+10+5=75.$

$7t+5\,o=75\,o.$

Draw squares to represent 73, 84, 89, 92.

Draw squares to represent $7\,t + 4\,o$, $8\,t + 10\,o$, $9t+9o$.

145. Complete:

70 + 1 = 71	7 *t* + 1 *o* = 71 *o*	71 = 7 *t* + 1 *o*
70 + 7 =	7 *t* + 7 *o* =	77 =
80 + 3 =	8 *t* + 3 *o* =	83 =
80 + 8 =	8 *t* + 8 *o* =	88 =
90 + 0 =	9 *t* + 0 *o* =	90 =
90 + 5 =	9 *t* + 5 *o* =	95 =
60 + 20 =	6 *t* + 2 *t* =	80 =

76 = 7 *t* + 6 *o*	70 *o* + 4 *o* = 74 *o* = 7 *t* + 4*o*, or 74
79 =	70 *o* + 7 *o* =
81 =	80 *o* + 5 *o* =
87 =	80 *o* + 10 *o* =
93 =	90 *o* + 3 *o* =
96 =	90 *o* + 10 *o* = 100 *o* = 10 *t*, or 100

1 dime + 5¢ = 15¢	1 *t* + 5 *o* = 15	12¢ = 1 dime + 2¢
2 dimes + 5¢ =	2 *t* + 5 *o* =	15¢ =
4 dimes + 2¢ =	4 *t* + 2 *o* =	17¢ =
5 dimes + 8¢ =	5 *t* + 8 *o* =	25¢ =
7 dimes + 5¢ =	7 *t* + 5 *o* =	38¢ =
8 dimes + 7¢ =	8 *t* + 7 *o* =	53¢ =
9 dimes + 9¢ =	9 *t* + 9 *o* =	81¢ =
9 dimes + 10¢ =	9 *t* + 10 *o* =	98¢ =

146. Write and read the numbers to 100.

Count backwards from 20 to 0. From 50 to 20.

Count by 2's to 50; then backwards to 2.

Count by 10's from 0 to 100; then backwards to 0.

Count by 10's from 1 to 91. From 2 to 92.

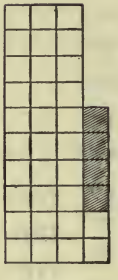
In 25 what does the 2 stand for? The 5?

In 33 the figures are alike. Do they mean the same thing?

Complete:

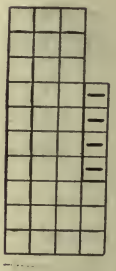
$24 = 20 + 4$	$46 =$	$74 =$	$88 =$
$27 =$	$48 =$	$77 =$	$89 =$
$22 =$	$52 =$	$79 =$	$67 =$
$31 =$	$55 =$	$82 =$	$94 =$
$34 =$	$68 =$	$85 =$	$96 =$
$39 =$	$71 =$	$87 =$	$99 =$

$24 + 3 =$



$32 + 4 =$

$25 - 3 =$



$37 - 4 =$

147. Add:

24	32	24	32	21	33	33
3	4	4	5	3	4	5
34	26	35	46	44	51	62
2	3	3	2	4	7	6
65	52	74	83	77	86	94
4	7	3	6	2	2	5

Subtract:

25	37	26	45	47	36	35
3	4	2	3	4	2	3
19	29	39	49	59	69	79
4	4	4	4	4	4	4
28	38	48	57	67	77	87
5	5	5	3	3	3	3

Name results quickly:

$21 + 1 =$	$21 + 2 =$	$21 + 3 =$	$21 + 4 =$
$31 + 1 =$	$31 + 2 =$	$31 + 3 =$	$31 + 4 =$
$41 + 1 =$	$51 + 2 =$	$41 + 3 =$	$41 + 4 =$
$51 + 1 =$	$71 + 2 =$	$51 + 3 =$	$51 + 4 =$
$71 + 1 =$	$22 + 2 =$	$22 + 3 =$	$22 + 4 =$
$91 + 1 =$	$32 + 2 =$	$32 + 3 =$	$32 + 4 =$
$61 + 1 =$	$42 + 2 =$	$42 + 3 =$	$42 + 4 =$
$81 + 1 =$	$52 + 2 =$	$52 + 3 =$	$52 + 4 =$

If you add 1 to numbers ending in 1, with what figure does the sum end?

If you add 2 to numbers ending in 1, with what figure does the sum end?

If you add 2 to numbers ending in 2, with what figure does the sum end?

If you add 3 to numbers ending in 1, with what figure does the sum end?

If you add 3 to numbers ending in 2, with what figure does the sum end?

If you add 4 to numbers ending in 2, with what figure does the sum end?

If you add 4 to numbers ending in 3, with what figure does the sum end?

When you increase 31 by 2, do you add 2 to the 1 or to the 3?

21 + 5 =	21 + 6 =	21 + 7 =	21 + 8 =
31 + 5 =	31 + 6 =	31 + 7 =	31 + 8 =
41 + 5 =	41 + 6 =	41 + 7 =	51 + 8 =
51 + 5 =	51 + 6 =	51 + 7 =	71 + 8 =
22 + 5 =	22 + 6 =	22 + 7 =	73 + 6 =
32 + 5 =	32 + 6 =	32 + 7 =	84 + 5 =
42 + 5 =	42 + 6 =	42 + 7 =	92 + 7 =
52 + 5 =	52 + 6 =	52 + 7 =	65 + 3 =

If you subtract 1 from numbers ending in 2, with what figure does each answer end?

If you subtract 1 from numbers ending in 3, with what figure does each answer end?

Add 3 to numbers ending in 5. What is the ending figure?

Subtract 5 from numbers ending in 8. What is the ending figure?

Find the value of:

24 — 1	26 — 3	87 — 4	49 — 7	16 — 5
34 — 1	46 — 3	18 — 5	79 — 7	26 — 5
74 — 1	86 — 3	28 — 5	88 — 6	66 — 5
15 — 2	17 — 3	48 — 5	58 — 6	18 — 8
25 — 2	27 — 3	19 — 6	39 — 8	28 — 8
35 — 2	57 — 3	29 — 6	28 — 3	49 — 9
65 — 2	77 — 4	39 — 6	47 — 4	86 — 6
16 — 3	97 — 4	89 — 7	56 — 5	99 — 7

5	15	25
35	**2**	45
55	65	75

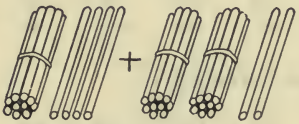
6	16	26
36	**3**	46
56	66	76

4	14	24
34	**4**	44
54	64	74

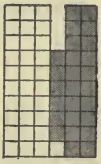
Add numbers in center of each square to each of the other numbers. Subtract central number from each of the others.

Addition and Subtraction.

$20 + 15 =$



$14 + 22$



$31 + 26$

148. If we put these splints all together, how many loose splints will we have? How many bundles, or tens?

$14 = 1\,t + 4\,o$
$22 = 2\,t + 2\,o$
$36 = 3\,t + 6\,o$

Four ones and 2 ones are 6 ones. One ten and 2 tens are 3 tens. Where is the 6 written? The 3? Which then is the *ones'* place? The *tens'* place?

$20 = 2\,t + 0\,o$
$15 = 1\,t + 5\,o$
$35 = 3\,t + 5\,o$

No ones and 5 ones are —— ones. Two tens and 1 ten are —— tens. Show me the 5 ones in the picture. The 2 tens. The 1 ten. The 3 tens. Which do we add first—the *ones* or the *tens*?

$31 = 3\,t + 1\,o$
$26 = 2\,t + 6\,o$
$57 = 5\,t + 7\,o$

Show me the 6 ones in the picture. The 7 ones. The 3 tens. The 2 tens. The 5 tens.

149. Add:

13	12	20	16	21	10	15	23
24	13	11	22	15	12	23	14
24	27	18	25	32	30	26	34
14	31	31	42	24	10	32	33
43	41	20	51	62	75	17	54
26	28	40	31	25	23	82	35
64	45	17	50	73	69	40	26
23	53	42	40	16	20	50	72

150. Find the value of:

$32 + 26$	$12 + 14$	$34 + 25$	$15 + 10$
$54 + 15$	$36 + 23$	$17 + 50$	$25 + 10$
$67 + 21$	$60 + 15$	$24 + 34$	$35 + 10$
$23 + 70$	$54 + 33$	$31 + 51$	$12 + 12$
$42 + 27$	$62 + 17$	$63 + 25$	$24 + 12$
$36 + 12$	$41 + 24$	$56 + 42$	$36 + 12$
$11 + 11$	$70 + 16$	$40 + 21$	$22 + 11$
$40 + 40$	$50 + 31$	$24 + 12$	$33 + 11$

A boy has 30 hens and 12 roosters. How many chickens has he?

A man paid a barber 25¢ for a hair-cut and 10¢ for a shave. For both he paid ——¢.

A farmer drove 14 miles to town and then drove home. How far did he drive?

Helen's papa gave her 50¢ and her mamma gave her a quarter. She then had —— cents.

There are 24 hours in a day. In two days there are —— hours.

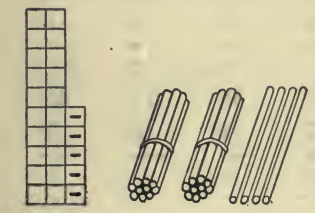
There were 20 cents in a box, when George put in 14 cents, and Ada 5 cents. How many cents were in the box then?

How many days in May and June together?

There are 45 pupils in one school and 42 in another. In both schools there are —— pupils.

Hallie's book has 23 pages more than there are in Odie's. There are 42 pages in Odie's book. How many pages are there in Hallie's book?

There are 33 frogs in one pond, and 24 in another. How many are there in both?



25 — 5 =

36 — 4 =

151. Here are 24 splints (2 tens and 4 ones). Take 4 away. How many are left?

Did you take the 4 from the loose splints (the ones) or from the tens? How many ones were left?

$$\begin{array}{r} 24 = 2\,t + 4\,o \\ 4 = \quad\; 4\,o \\ \hline 20 = 2\,t + 0\,o \end{array} \qquad \begin{array}{r} 25 = 2\,t + 5\,o \\ 5 = \quad\; 5\,o \\ \hline 20 = 2\,t + 0\,o \end{array}$$

Show with splints how many 16 — 6 are.

Draw squares to represent 18 — 8.

Show me 3 tens and 5 ones with splints. Take 3 away and tell me what you have left.

From what did you take the 3 splints? How many ones were left? How many tens?

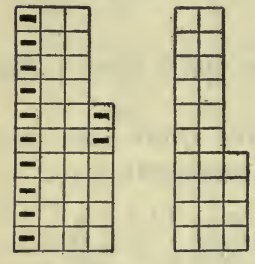
$$\begin{array}{r} 35 = 3\,t + 5\,o \\ 3 = \quad\; 3\,o \\ \hline 32 = 3\,t + 2\,o \end{array} \qquad \begin{array}{r} 36 = 3\,t + 6\,o \\ 4 = \quad\; 4\,o \\ \hline 32 = 3\,t + 2\,o \end{array}$$

Show with splints how many $17 - 4$ are.

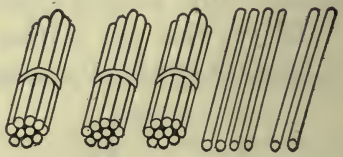
Draw squares to represent $24 - 3$.

152. Subtract:

16	26	36	46	18	28	38	48
4	4	4	4	5	5	5	5
18	27	26	37	49	68	75	89
8	3	2	4	7	3	5	7



$36 - 12 = 24.$



153. Here are 36 splints. How many tens? How many ones?

Take away 12 splints (2 ones and 1 ten).

How many ones are left? How many tens? How many splints?

36
12
24

Two ones from 6 ones leaves —— ones. One ten from 3 tens leaves —— tens. Two tens and 4 ones are ——. Which do we subtract first—the *ones* or the *tens*?

When 12 is subtracted from 36, what is the *remainder?* Show me the squares that represent it.

Take 25 splints (2 tens and 5 ones.) Take away 13 splints (1 ten and 3 ones). How many ones remain? How many tens? How many splints? 25 — 13 =

Draw squares to represent 25 — 10.

154. Subtract:

13	16	26	34	45	24	27	30
2	4	14	14	12	12	15	10
37	44	56	63	58	76	69	75
14	12	24	21	33	25	36	50
86	93	77	68	84	50	95	98
41	21	34	58	62	30	70	23
80	72	97	48	59	76	81	99
60	52	60	18	21	41	31	44

23
42 4 ones, 2 ones, and 3 ones are —— ones.
14 1 ten, 4 tens, and 2 tens are —— tens.
79 The sum is —— tens and —— ones, or ——.

Find the sum:

12	14	11	20	30	25	13	21
24	31	42	45	27	40	35	16
51	23	45	13	32	14	40	51
23	27	18	25	32	30	26	34
31	42	54	26	28	20	17	64
24	30	21	11	31	13	2	10

Jane had 3 dimes and a nickel. She gave a dime and a nickel for a slate. How much money had she left?

William earned 45 cents on Friday and 30 cents on Saturday. On both days he earned —— cents.

There are 24 hours in a day. If you work 10 hours, how many hours do you have for rest?

If you cut 12 feet from a fish line 36 feet long, how many feet of line will be left?

This week there are 69 pupils in school; last week there were 48. How many new pupils have come this week?

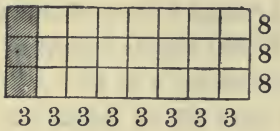
Robert had 40 cents, Mack had 30 cents, and Clyde had 10 cents. How many more cents did the three boys need to make a dollar?

George has 14 marbles and Tom has 10 more. They both have —— marbles?

The white hen has 15 chicks, and the black hen has 5 less. They both have —— chicks.

John had a knife worth 45 cents, which he traded to Walter for his knife and 2 nickels. What was Walter's knife worth?

Numbers to 30.



155. What is the name of the number made up of 2 tens and 1?

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

How many squares in the rectangle? How many *threes?* Then 8 threes are ——.

How many squares in the upper row? How many rows? Then 3×8 squares = —— squares.

Show that 8×3 squares = 3×8 squares.

The dark row is what part of the rectangle? One part out of 8 parts is called one ——.

Show how many eighths of the rectangle make $\frac{1}{2}$ of it.

$\frac{1}{8}$ of 24 squares = —— squares.
$\frac{4}{8}$ of 24 squares = —— squares.
$\frac{1}{2}$ of 24 squares = —— squares.
$\frac{1}{2}$ of the rectangle = ——squares.

The upper row is what part of the rectangle?

$\frac{1}{3}$ of 24 squares = —— squares.
$\frac{2}{3}$ of 24 squares = —— squares.

How many light squares are there? How many 3's make 21? How many 7's?

$\frac{1}{3}$ of 21 squares = —— squares.
$\frac{2}{3}$ of 21 squares = —— squares.

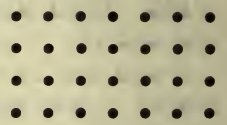
Make 4 dots six times. How many dots have you?

How many 4's make 24?

Arrange 5 rows of 5 dots each in a square, as in the number picture at the left. Tell how many 5's in 25.

Count by 5's to 25. $5 \times 5 =$ ——.

Make 3 dots 9 times. How many dots have you? How many 3's make 27? How many 9's?



Show by the picture at the right that 4×7 dots $= 7 \times 4$ dots.

How many 4's in 28? How many 7's in 28?

Count by 3's to 30. How many 3's make 30?

156. Complete and memorize:

$1 \times 3 = 3.$	$3 \times 1 = 3.$
$2 \times 3 =$	$3 \times 2 =$
$3 \times 3 =$	$3 \times 3 =$
$4 \times 3 =$	$3 \times 4 =$
$5 \times 3 =$	$3 \times 5 =$
$6 \times 3 =$	$3 \times 6 =$
$7 \times 3 =$	$3 \times 7 =$
$8 \times 3 =$	$3 \times 8 =$
$9 \times 3 =$	$3 \times 9 =$
$10 \times 3 =$	$3 \times 10 =$

157. 3 squares are found in 18 squares —— times.
3 squares are found in 24 squares —— times.
3 squares are found in 30 squares —— times.
3 squares are found in 21 squares —— times.

What added to 2 tens makes 22? 23? 26? 29?

Find $\frac{1}{2}$ of 22 splints. $\frac{1}{2}$ of 22 = ——.

How many elevens make 22?

Find how many 12's make 24?

158. Find the value of:

$9 \div 3$	$30 \div 3$	$20 \div 2$	$20 \div 10$
$15 \div 3$	$27 \div 3$	$24 \div 2$	$40 \div 10$
$12 \div 3$	$12 \div 2$	$22 \div 2$	$60 \div 10$
$18 \div 3$	$18 \div 2$	$20 \div 3$	$50 \div 10$
$24 \div 3$	$16 \div 2$	$16 \div 3$	$30 \div 10$
$21 \div 3$	$14 \div 2$	$22 \div 3$	$80 \div 10$

$4 \times 6 =$	$24 \div 6 =$	$\frac{1}{3}$ of $21 =$	$28 = 18 +$ ——.
$4 \times 7 =$	$28 \div 7 =$	$\frac{1}{3}$ of $24 =$	$28 = 20 +$ ——.
$5 \times 5 =$	$25 \div 5 =$	$\frac{1}{3}$ of $27 =$	$27 = 21 +$ ——.
$6 \times 4 =$	$24 \div 4 =$	$\frac{1}{4}$ of $24 =$	$26 = 22 +$ ——.
$21 \div 7 =$	$28 \div 4 =$	$\frac{1}{4}$ of $28 =$	$29 = 21 +$ ——.
$24 \div 8 =$	$24 \div 2 =$	$\frac{1}{5}$ of $25 =$	$30 = 20 +$ ——.
$20 \div 5 =$	$20 \div 4 =$	$\frac{1}{2}$ of $24 =$	$25 = 19 +$ ——.

159. Find the cost of 10 pints of milk at 3¢ a pint.

A boy walks 3 miles a day. In 7 days he walks —— miles.

A man who had 24 bushels of potatoes sold $\frac{1}{2}$ of them. How many had he left?

Mr. Jones had 27 sheep but 3 of them died. He then had —— sheep left.

What will 2 dozen eggs cost at a cent apiece?

How many ounces in $\frac{1}{4}$ of a pound? In $\frac{3}{4}$ of a pound?

A blacksmith has 24 horseshoes. He can shoe —— horses with them.

With 25 cents I can buy —— 3-cent stamps, and I shall have —— left.

A man had $30. He gave $\frac{1}{10}$ of it for a pair of shoes. Find the cost of the shoes.

A room is 27 feet long. How many yards long is it?

Divide 21 apples equally among 3 boys. How many apples will each boy have?

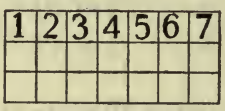
If you have 25 oranges, how many times can you give away oranges if you give 5 each time?

If it takes 4 men 7 days to dig a certain ditch, how long will it take 1 man to dig the ditch?

How many weeks are there in 28 days?

If you sleep 8 hours every day, what part of the whole day do you sleep? In 1 day there are —— hours.

How many days has February? When a week of this month has passed, how many days of it will be left?



How many squares in the upper row of this rectangle? How many rows?

3×7 squares $=$ —— squares.

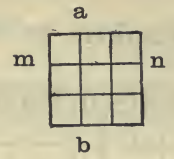
Draw a rectangle 7 inches long and 3 inches wide. Draw lines to divide it into square inches.

How many sq. in. in 1 row? How many rows?

3×7 sq. in. $=$ —— sq. in.

Find how many square inches in each of the following:

A square, 5 inches on a side.
A rectangle, 6 inches by 4 inches.
A rectangle, 7 inches by 4 inches.
A rectangle, 10 inches by 3 inches.



160. In this picture the line *ab* is a *vertical* line. Which other lines are vertical?

The line *mn* is a *horizontal* line. Point out the other horizontal lines.

Draw on the blackboard a square 3 feet on each side. Draw two horizontal lines to divide it into 3 equal parts.

Then draw two vertical lines to divide it into 9 equal parts. How long is each of the 9 parts? How wide?

What is the shape of each part?

A square that is a foot on each side is called a *square foot* (sq. ft.).

How many square feet are there in your large square?

Measure the large square with the yardstick. What is the length in yards? The width?

A square that is a yard on each side is called a *square yard* (sq. yd.).

Now who can tell how many square feet in a square yard?

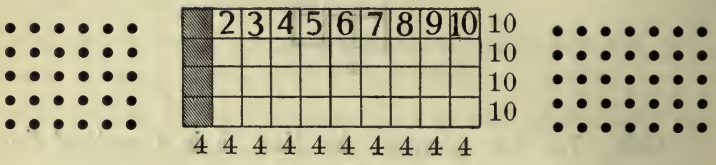
In 3 square yards there are —— square feet.

A rug is 5 ft. square. How many square feet in it?

A strip of carpet is 9 yards long and 1 yard wide. It contains —— square yards.

There are 4 strips of carpet on our bedroom. Each strip is 5 yards long and a yard wide. How many square yards of carpet are there?

Numbers to 40.



161. What is the name of the number made up of 3 tens and 1? 3 tens and 2? 3 tens and 3?

Read the numbers: 34; 35; 36; 37; 38; 39.

In 5 rows of 6 dots each there are —— dots.

$5 \times 6 =$ ——. $6 \times 5 =$ ——. $30 \div 5 =$ ——.

In 5 rows of 7 dots each there are —— dots.

5 times 7 are ——. 7 times 5 are ——.

Show by the dots at the right how many 7's in 35. How many 5's in 35?

How many squares in this rectangle? How many tens? How many fours?

Show that 4×10 squares $= 10 \times 4$ squares.

The upper row is what part of the rectangle? Then $\frac{1}{4}$ of 40 squares is —— squares.

The left-hand column is what part of the rectangle? Then $\frac{1}{10}$ of 40 squares is —— squares.

162. How many squares are there in 7 columns? Then 7×4 squares are —— squares.

Make 4 rows of 7 dots each. How many dots?

How many 4's make 28? How many 7's?

Draw a ring around $\frac{1}{4}$ of the dots. $\frac{1}{4}$ of $28 =$ ——.

163. How many squares are there in 8 columns? Then 8×4 are —— squares.

Here are 32 blocks. Give me $\frac{1}{2}$ of them. $\frac{1}{2}$ of $32 =$ ——.

Now divide these 32 blocks into 4 equal parts. How many in each part? $\frac{1}{4}$ of $32 =$ ——.

164. How many squares in 1 column? How many columns are light? How many squares are light?

9×4 squares $=$ —— squares. $9 \times 4 =$ ——.

Divide 36 splints into 4 equal piles. How many splints in each pile?

36 splints $\div 4 =$ —— splints.

Separate 36 splints into 9 equal piles. How many splints in each pile?

36 splints $\div 9 =$ —— splints.

Lay 36 blocks in 3 equal rows. How many 3's make 36? How many 12's?

Make a square of dots, having six dots on each side.

In 6 rows of 6 dots each there are —— dots.

Count by 4's to 36. Count by 6's to 36.

Count by 4's to 40. How many 4's make 40?

165. Complete and memorize:

$1 \times 4 = 4.$	$4 \times 1 = 4.$
$2 \times 4 =$	$4 \times 2 =$
$3 \times 4 =$	$4 \times 3 =$
$4 \times 4 =$	$4 \times 4 =$
$5 \times 4 =$	$4 \times 5 =$
$6 \times 4 =$	$4 \times 6 =$
$7 \times 4 =$	$4 \times 7 =$
$8 \times 4 =$	$4 \times 8 =$
$9 \times 4 =$	$4 \times 9 =$
$10 \times 4 =$	$4 \times 10 =$

166. 4 squares are contained in 24 squares —— times.
4 squares are contained in 32 squares —— times.
4 squares are contained in 28 squares —— times.
4 squares are contained in 36 squares —— times.

Show by dots how many 3's make 33. How many 11's?

$\frac{1}{3}$ of 33 dots = —— dots.

What added to 3 tens makes 34? 37?

Count by 3's from 0 to 36, then backwards to 3.
Count by 4's from 0 to 40, then backwards to 4.
Count by 3's from 1 to 37, then backwards to 1.
Count by 4's from 1 to 41, then backwards to 1.
Count by 4's from 2 to 38, then backwards to 2.

167. Find the value of:

$8 \div 4$	$32 \div 4$	$28 \div 2$	$30 \div 3$
$16 \div 4$	$36 \div 4$	$26 \div 2$	$40 \div 2$
$12 \div 4$	$40 \div 4$	$34 \div 2$	$\frac{1}{2}$ of 40
$20 \div 4$	$32 \div 2$	$24 \div 2$	$\frac{1}{3}$ of 36
$28 \div 4$	$36 \div 2$	$33 \div 3$	$\frac{1}{4}$ of 40
$24 \div 4$	$30 \div 2$	$36 \div 3$	$\frac{1}{4}$ of 36

$5 \times 6 =$	$30 \div 6 =$	$\frac{1}{5}$ of $30 =$	$37 = (\ ) \times 4 +$
$5 \times 7 =$	$32 \div 8 =$	$\frac{1}{6}$ of $30 =$	$31 = (\ ) \times 4 +$
$6 \times 6 =$	$35 \div 7 =$	$\frac{1}{5}$ of $35 =$	$34 = (\ ) \times 4 +$
$5 \times 5 =$	$36 \div 9 =$	$\frac{1}{6}$ of $36 =$	$38 = (\ ) \times 4 +$

168. Our hens lay 4 eggs a day. How many will they lay in 10 days?

How many quarts in 6 gal.? In 9 gal.?

How many months in 2 yr.? In 3 yr.? In $\frac{1}{2}$ of a year?

I have 4 rows of peach trees, 8 in each row. How many trees have I?

Mr. Wilson has 11 barrels of apples, 3 bushels in each barrel. He has —— bushels of apples.

In 35 days there are —— weeks.

How many cents are 6 five-cent pieces?

How many eggs are there in 3 dozen eggs?

From the 8th to the 29th of May there are —— days, or —— weeks.

How many inches long is the yard-stick?

A line is 3 feet 2 inches long. How many inches is it?

John took 36 pecks of potatoes to the store. How many bushels was that?

How many 5-cent stamps can you buy for 30 cents?

A farmer has 32 horses. How many 4-horse teams can he form?

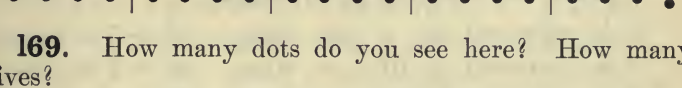
At 5 cents a ride, how many street-car rides can be taken for 30 cents?

Mr. Henry gave 30 cents to his children. Each child got a dime. How many children has he?

A bushel of oats weighs 32 pounds. How much does a peck weigh?

Eight quarts make a peck. How many quarts in a bushel? 4×8 qt. = —— qt.

Numbers to 50.



169. How many dots do you see here? How many fives?

10×5 dots = —— dots.
5×10 dots = —— dots.

Find from the picture how many 5 times 5 dots are. 6 times 5 dots. 8 times 5 dots. 7 times 5 dots. 9 times 5 dots.

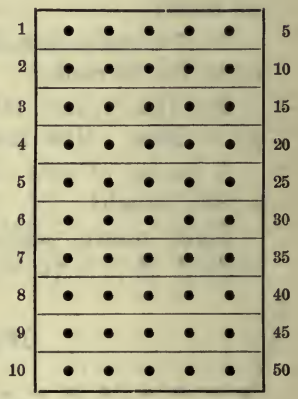
Count by 5's from 5 to 50, then backwards to 5.

Complete and memorize:

1 five = 5.	1 × 5 = 5.	5 × 1 = 5.
2 fives =	2 × 5 =	5 × 2 =
3 fives =	3 × 5 =	5 × 3 =
4 fives =	4 × 5 =	5 × 4 =
5 fives =	5 × 5 =	5 × 5 =
6 fives =	6 × 5 =	5 × 6 =
7 fives =	7 × 5 =	5 × 7 =
8 fives =	8 × 5 =	5 × 8 =
9 fives =	9 × 5 =	5 × 9 =
10 fives =	10 × 5 =	5 × 10 =

Find the value of:

$4 \times 5 + 5$	$5 \times 4 + 6$	$\frac{1}{2}$ of 24
$5 \times 5 + 3$	$7 \times 4 + 2$	$\frac{1}{4}$ of 20
$7 \times 5 + 1$	$8 \times 3 + 5$	$\frac{3}{4}$ of 20
$8 \times 5 + 2$	$9 \times 4 + 2$	$\frac{1}{3}$ of 21



170. Show how many times—

5 blocks are contained in 15 blocks.

5 blocks are contained in 25 blocks.

5 pegs are contained in 30 pegs.

5 inches are contained in 10 inches.

5 is contained in 5 one time.	$5 \div 5 =$ ——.
5 is contained in 10 —— times.	$10 \div 5 =$ ——.
5 is contained in 20 —— times.	$20 \div 5 =$ ——.
5 is contained in 25 —— times.	$25 \div 5 =$ ——.
5 is contained in 40 —— times.	$40 \div 5 =$ ——.
5 is contained in 50 —— times.	$50 \div 5 =$ ——.
5 is contained in 45 —— times.	$45 \div 5 =$ ——.

Point out one of the 5 equal parts of 50 dots.

171. Is $\frac{1}{5}$ of 50 dots the same as 50 dots $\div$ 5? Prove it. How much is $\frac{1}{5}$ of 25 cents? $\frac{2}{5}$ of 25 cents?

How many dots in each row of dots at the left?

How many rows are there?

In 6 rows of 7 dots each there are —— dots.

$7 \times 6 =$ ——. $6 \times 7 =$ ——.

Add to 42 by 6's. How many 6's in 42?

Add to 42 by 7's. How many 7's in 42?

In 6 rows of 8 dots each there are —— dots.

By aid of the middle picture, complete:

$6 \times 8 =$ ——. $8 \times 6 =$ ——. $48 \div 6 =$ ——. $48 \div 8 =$ ——.

In a square made of dots, 7 dots on each side, there are —— dots.

$7 \times 7 =$ ——. $49 \div 7 =$ ——.

172. Copy and complete:

$50 \div 5 =$	$35 \div 5 =$	$50 \div 10 =$	$\frac{1}{10}$ of $50 =$
$30 \div 5 =$	$15 \div 5 =$	$30 \div 10 =$	$\frac{2}{10}$ of $50 =$
$40 \div 5 =$	$17 \div 5 =$	$40 \div 10 =$	$\frac{1}{5}$ of $50 =$
$20 \div 5 =$	$21 \div 5 =$	$20 \div 10 =$	$\frac{5}{10}$ of $50 =$
$25 \div 5 =$	$28 \div 5 =$	$25 \div 10 =$	$\frac{1}{2}$ of $50 =$
$45 \div 5 =$	$32 \div 5 =$	$45 \div 10 =$	$\frac{2}{2}$ of $50 =$

$40 \div 8 =$	$6 \times 7 =$	$42 \div 7 =$	$6 \times 8 =$
$45 \div 9 =$	$7 \times 7 =$	$42 \div 6 =$	$7 \times 6 =$
$40 \div 4 =$	$8 \times 5 =$	$48 \div 8 =$	$4 \times 10 =$
$48 \div 6 =$	$4 \times 9 =$	$49 \div 7 =$	$41 \div 5 =$

173. How many cents are 6 nickels worth?

Our cow gives 10 quarts of milk a day. In 5 days she gives —— quarts.

How many flags at 5 cents apiece can I buy for 17 cents? How many cents shall I have left?

For 17 cents I can buy —— flags. I shall have —— cents left.

How many 5-cent stamps can I buy for 30¢? Draw the picture.

Forty pecks of onions are how many bushels?

A house is 12 yards long. It is —— feet long.

At 6 dollars a ton, how many tons of coal can be bought for 42 dollars?

What will 7 yards of cloth cost at 7 cents a yard?

A pansy has five petals. How many petals do 9 pansies have?

How many times can a 5-inch line be measured off on a line 40 inches long?

Ben had 30 cents and gave $\frac{1}{5}$ of it for candy. How much money had he left? Show by drawing.

What are 3 dozen eggs worth at 1 cent apiece?

What will a pound and a half of butter cost at 16 cents a pound?

Draw a rectangle 10 inches long and 4 inches wide. Divide it into square inches. How many are there?

How many rows are there running lengthwise?

How many inch squares in each row?

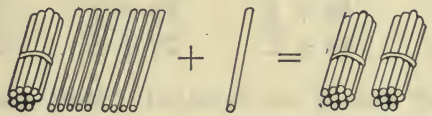
How many square inches, then, are 4 times 10 square inches?

Find the number of square inches in the following:

A square, measuring 7 inches on a side.
A rectangle, 10 inches by 5 inches.
A rectangle, 10 inches by 4 inches.
A rectangle, 9 inches by 5 inches.

9 *square feet* make 1 *square yard.* How many square yards are there in 45 sq. ft.?

Addition and Subtraction.



$$1t + 9o + 1o = 2t + 0o$$
$$19 + 1 = 20$$

174. Take 19 splints. Make a bundle of 10. How many do you need to make another ten?

$$\begin{array}{r} 19 = 1t + 9o \\ 1 = \quad 1o \\ \hline 20 = 2t + 0o \end{array} \qquad \begin{array}{r} 29 = 2t + 9o \\ 1 = \quad 1o \\ \hline 30 = 3t + 0o \end{array}$$

Show with splints how many 39 and 1 are. 49 and 1.

Add:

$$\begin{array}{cccccc} 49 & 59 & 79 & 89 & 69 & 99 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ \hline \end{array}$$

How many splints must you put with 18 to make 2 tens? With 28 to make 3 tens?

$$\begin{array}{r} 18 = 1t + 8o \\ 2 = \quad 2o \\ \hline \end{array} \qquad \begin{array}{r} 28 = 2t + 8o \\ 2 = \quad 2o \\ \hline \end{array}$$

Show with splints how many 38 and 2 are. 48 and 2.

Add:

38	48	78	58	88	68	98
2	2	2	2	2	2	2

Name results quickly:

$9 + 1$	$28 + 2$	$59 + 1$	$78 + 2$
$8 + 2$	$39 + 1$	$58 + 2$	$89 + 1$
$19 + 1$	$38 + 2$	$69 + 1$	$88 + 2$
$18 + 2$	$49 + 1$	$68 + 2$	$99 + 1$
$29 + 1$	$48 + 2$	$79 + 1$	$98 + 2$

How many tens in one hundred? How many tens in half a hundred? How many ones?

$\frac{1}{2}$ of 100 = —— tens, or —— ones.

$9 + 2$ =

$19 + 2$ =

175. Nine splints and 2 splints are —— splints.

Nineteen splints and 2 splints are —— splints.

Take one splint from the two and put it with the nine. You now have 1 ten and 1 one, or ——.

Take one splint from the other two and put it with the nine. You now have —— tens and —— one, or ——.

Show by splints how many 29 and 2 are. 39 and 2. 49 and 2.

9	19	29	39	49	59	69	79
2	2	2	2	2	2	2	2
11							

176. Take 11 splints (a ten and a one). How can you take 2 splints away from the 11? How many must you take from the *ten?* How many will be left?

Take 21 splints—2 tens and a one. Take away 2 splints. How many must you take from one of the tens? How many tens and how many ones will be left?

Show by splints how many 31 less 2 are. 41 — 2. 51 — 2. 61 — 2.

11	21	31	41	51	61	71	81
2	2	2	2	2	2	2	2
9							

177. Find the value of:

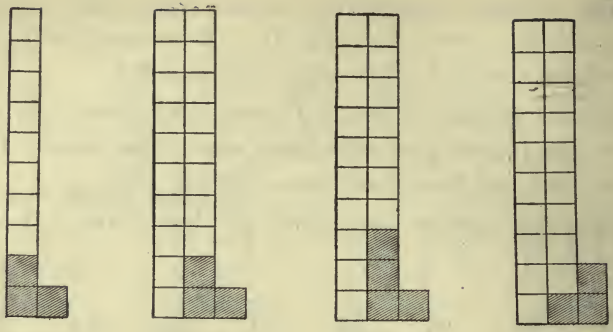
9 + 2	8 + 2	11 — 2	10 — 2
19 + 2	18 + 2	21 — 2	20 — 2
39 + 2	48 + 2	41 — 2	30 — 2
49 + 2	28 + 2	61 — 2	50 — 2
29 + 2	68 + 2	31 — 2	60 — 2
69 + 2	38 + 2	51 — 2	40 — 2
89 + 2	58 + 2	71 — 2	70 — 2
79 + 2	78 + 2	81 — 2	90 — 2
59 + 2	98 + 2	91 — 2	80 — 2

Add by 2's from 2 to 50.

Subtract by 2's from 40 to 18.

Add by 2's from 9 to 61.

Subtract by 2's from 49 to 9.



8 + 3 18 + 3 17 + 4 19 + 3

178. Show with blocks that 8 + 3 = 1 ten and 1 one, or 11.

Show that 18 + 3 = —— tens and —— one, or ——.
Show that 28 + 3 = —— tens and —— one, or ——.
Show that 17 + 4 = —— tens and —— one, or ——.
Show that 19 + 3 = —— tens and —— ones, or ——.

179. How many squares do you see in the picture at the left? How many of them will be left if you take away the 3 dark ones?

How many squares in the next picture? How many light ones?

Show that 21 — 3 = 1 ten and 8 ones, or 18.
Show that 31 — 3 = —— tens and 8 ones, or ——.
Show that 21 — 4 = —— ten and —— ones, or ——.
Show that 22 — 3 = —— ten and —— ones, or ——.

Add; also, subtract:

11	21	31	41	61	81	71	51
3	3	3	3	3	3	3	3

21	31	41	51	71	61	91	81
4	4	4	4	4	4	4	4
22	32	42	62	52	72	82	92
3	3	3	3	3	3	3	3

180. Name results at sight:

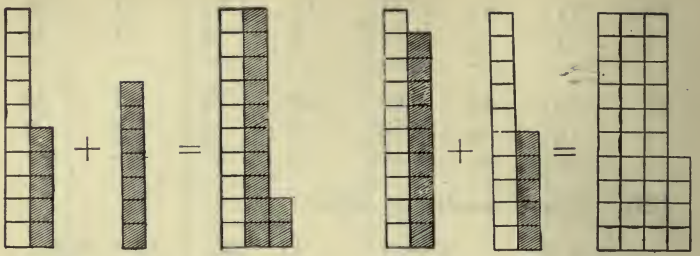
$8+3$	$7+4$	$11-3$	$11-4$
$18+3$	$17+4$	$21-3$	$21-4$
$28+3$	$27+4$	$31-3$	$31-4$
$58+3$	$37+4$	$51-3$	$41-4$
$48+3$	$67+4$	$61-3$	$61-4$
$68+3$	$87+4$	$41-3$	$81-4$
$38+3$	$47+4$	$81-3$	$71-4$
$88+3$	$57+4$	$71-3$	$51-4$
$78+3$	$77+4$	$91-3$	$91-4$

Add by 3's from 0 to 51. From 2 to 50.
Subtract by 4's from 48 to 0. From 45 to 1.

181. Name results at sight:

$8+4$	$9+4$	$12-4$	$13-4$
$18+4$	$19+4$	$22-4$	$23-4$
$28+4$	$29+4$	$32-4$	$43-4$
$38+4$	$49+4$	$42-4$	$53-4$
$48+4$	$39+4$	$62-4$	$33-4$
$68+4$	$79+4$	$82-4$	$73-4$
$88+4$	$89+4$	$52-4$	$93-4$
$78+4$	$69+4$	$72-4$	$63-4$
$58+4$	$59+4$	$92-4$	$83-4$

Add 5 to 16, 26, 36, 46, 56, 66, 76, 86.
Subtract 5 from 21, 31, 41, 51, 61, 71, 81, 91.



15 + 7 = 19 + 15 =

182. Find the sum of 15 and 7.

Write 15 and then write the 7 ones under the 5 ones. 15
7 ones and 5 ones are —— ones, or 1 ten and 2 ones. 7

Write the 2 ones in *ones'* place under 7. 22
What shall be done with the ten? Add it to the 1 ten in 15. 1 ten and 1 ten are —— tens.
In what place do we write the tens?

Find the sum of 19 and 15.

5 ones + 9 ones = 14 ones, or 1 ten and 4 ones. 19
1 ten + 1 ten + 1 ten = —— tens. 15
34

Copy and add:

18	38	29	32	63	42	78	69
4	4	15	19	28	39	14	24
25	35	27	64	43	57	68	34
56	48	16	18	32	25	17	38
63	42	74	31	28	36	43	54
28	39	17	49	64	58	37	39

26	57	44	87	65	39	76	58
58	27	37	15	26	47	18	37
15	16	23	14	26	32	29	40
23	34	42	37	38	18	29	27
47	26	18	25	14	47	30	19

183. Find the value of:

$36 + 14$	$25 + 45$	$33 + 49$	$26 + 35 + 18$
$33 + 17$	$81 + 19$	$62 + 28$	$17 + 23 + 46$
$42 + 18$	$46 + 37$	$71 + 29$	$35 + 18 + 26$
$82 + 18$	$34 + 58$	$80 + 18$	$24 + 39 + 27$
$47 + 14$	$76 + 17$	$46 + 35$	$31 + 17 + 46$

184. There are 31 days in May and 30 in June. In both months there are —— days.

Mr. Jones has 58 sheep in one field and 37 in another. In both fields he has —— sheep.

Ella is 18 years old and her mother is 36 years older. How old is her mother?

Our black horse cost \$65 and our red cow cost \$25. How much did both cost?

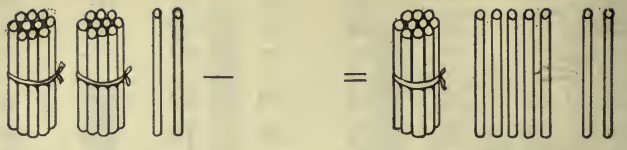
If a room is 18 feet long and 16 feet wide, how many feet is it around the room?

A Christmas tree held 13 dolls, 27 balls, 37 flags, and 17 bags. How many articles were there in all?

Edith paid 35 cents for a book, 15 cents for paper, and 3 cents for a ruler. How much did they all cost her?

Mr. White's wagon cost \$42. His buggy cost \$29 more than the wagon. How much did the buggy cost?

How many days are there in October, November, and December?



$2t + 2o - 5o = 1t + 7o$

$22 - 5 = 17$

185. Take 22 splints (2 tens and 2 ones). How many ones can you take away without taking any from a bundle?

If you wish to take 5 splints away, how many *ones* must you take from one of the tens? How many ones will be left? One ten and 7 ones are ——.

Take 32 splints (3 tens and 2 ones). How can you take 7 splints away? Can you take 7 ones from the 2 ones?

Take the string from one of the bundles. Now how many ones have you? Take 7 splints away. How many ones are left? How many tens?

$22 = 2t + 2o = 1t + 12o.$ $\quad 32 = 3t + 2o = 2t + 12o.$

$5 = \quad 5o = \quad 5o.$ $\quad 7 = \quad 7o = \quad 7o.$

$17 = \quad = 1t + 7o.$ $\quad 25 = \quad = 2t + 5o.$

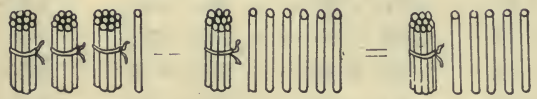
How many squares do you see in the picture? How many tens? How many ones?

We cannot take 5 squares from the 3 squares, so we must take one of the tens and and put it with the 3 ones, making 13 ones. We then have 2 tens and 13 ones. What is left when 5 ones are taken away?

Show with splints how many 23 less 5 are. 31 less 7.

Subtract:

24	25	32	26	21	34	35
7	6	7	8	5	5	8



31 — 16 = 15

We cannot take 6 from 1, so we put one of the tens with the 1, and take 6 from 11. There are only 2 tens left, so we take the 1 ten from 2 tens.

$$\begin{array}{rcl} 31 & = & 20 + 11 \\ 16 & = & 10 + \ 6 \\ \hline 15 & = & 10 + \ 5 \end{array}$$

NOTE.—Of course, as soon as the pupils understand the process, they should do the work without any change of figures.

Show with splints how to subtract 12 from 31. 15 from 32. Use splints to show how many 25 less 15 are. 45 less 20.

186. Copy and subtract:

23	31	34	42	63	54	36	75
8	6	16	25	34	28	19	47
60	91	40	53	68	90	84	93
29	16	25	15	35	50	30	48
44	55	64	45	74	80	100	100
28	37	26	28	24	51	50	80

187. Find the value of:

34 — 16	44 — 19	52 — 27	41 — 16
42 — 15	50 — 38	75 — 36	52 — 27
61 — 24	72 — 22	44 — 18	63 — 38
83 — 15	67 — 28	63 — 45	74 — 49
21 — 12	83 — 38	81 — 50	85 — 56
75 — 54	62 — 43	27 — 9	96 — 67
92 — 65	91 — 56	50 — 13	43 — 15

188. How many more days are there in this month?

A man wants to buy a watch for $32. He has only $25. How much more does he need?

Julia bought a doll for 29 cents, and gave the storekeeper a half-dollar. How much change did she get?

In a school there are 45 pupils. There are 26 boys. How many girls are there?

What number must you add to 14 to get 21?

What number must you subtract from 32 to get 24?

A man paid $94 for a horse and cart. He paid $18 for the cart and $—— for the horse.

Grandma is 83 years old, and Lizzie is 7 years old. How much older is grandma than Lizzie?

If your mamma had 2 dozen eggs, and used all of them at Easter but a half-dozen, how many did she use?

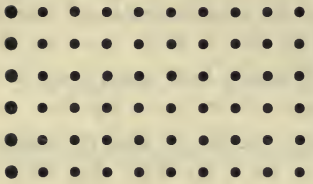
How many days from the 11th of June to the 9th of July?

A barrel of oil contained 53 gallons but 5 gallons leaked out. There were —— gallons left in.

Mrs. Hill had 62 hens. She sold 27 of them and had —— left.

Tom weighs 96 pounds and Warren 78 pounds. How many more pounds does Tom weigh than Warren?

Numbers to Sixty.



189. How many dots in the picture? How many rows of 10 dots each?

6×10 dots $=$ —— dots.

How many large dots do you see? How many *sixes* are there?

10×6 dots $=$ —— dots.

In 60 there are —— tens or —— sixes.

How many times can you take 10 dots from 60 dots?

60 dots $\div$ 10 dots $=$ —— times.

The large dots are what part of the 60 dots? $\frac{1}{10}$ of 60 dots $=$ —— dots.

How many tenths of the 60 dots equal $\frac{1}{2}$ of the 60 dots?

Ten dots are what part of 60 dots? $\frac{1}{6}$ of 60 dots $=$ —— dots.

How many sixths of 60 equal $\frac{1}{2}$ of 60?

In 60 there are —— twelves.

In 60 there are —— fives.

190. How many small dots in the picture? How many rows of 9 dots each? How many columns of 6 dots each?

6×9 dots $=$ —— dots. 9×6 dots $=$ —— dots.

Draw a rectangle 9 inches long and 6 inches wide, and draw horizontal and vertical lines to divide it into square inches.

How many squares inches does it contain? How many times 6 sq. in.? How many times 9 sq. in.?

How many sq. in. in one-sixth of the rectangle? $\frac{1}{6}$ of 54 = ——. 54 sq. in. ÷ 6 = —— sq. in.

In $\frac{1}{9}$ of the rectangle how many sq. in. ? $\frac{1}{9}$ of 54 = ——. 54 sq. in. ÷ 9 = —— sq. in.

Show how many *sixths* of the rectangle equal $\frac{1}{3}$ of it.

Count by 4's to 60. By 5's. By 6's.

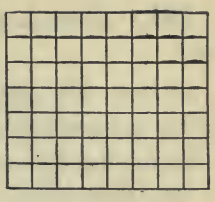
191. Complete and memorize:

1 six = 6	1 × 6 = 6.	6 × 1 = 6.
2 sixes =	2 × 6 =	6 × 2 =
3 sixes =	3 × 6 =	6 × 3 =
4 sixes =	4 × 6 =	6 × 4 =
5 sixes =	5 × 6 =	6 × 5 =
6 sixes =	6 × 6 =	6 × 6 =
7 sixes =	7 × 6 =	6 × 7 =
8 sixes =	8 × 6 =	6 × 8 =
9 sixes =	9 × 6 =	6 × 9 =
10 sixes =	10 × 6 =	6 × 10 =

192. Find how many times:

6 dots are contained in 18 dots.
6 squares are contained in 30 squares
6 eggs are contained in 48 eggs.
6 blocks are contained in 36 blocks.
6 inches are contained in 42 inches.
6 beans are contained in 54 beans.
6 feet are contained in 24 feet.
9 sq. ft. are contained in 36 sq. ft.
9 sq. ft. are contained in 54 sq. ft.
9 dollars are contained in 45 dollars.

193. In 7 rows of 8 squares each there are —— squares.



How many times 7 squares make 56 squares?

Show that 7×8 squares $= 8 \times 7$ squares.

How many times are 8 squares found in the 56 squares? 7 squares?

56 squares $\div$ 8 squares = —— times. 56 squares $\div$ 7 squares = —— times.

What part of the rectangle is found in the upper row? Two rows are what part of the rectangle? Three rows?

Four-sevenths of 56 squares are —— squares.

Seven squares are what part of the 56 squares? 14 squares?

Compare $\frac{2}{8}$ of the squares with $\frac{1}{4}$ of them.

56 squares $\div$ 8 = —— squares. 56 squares $\div$ 7 = —— squares.

How many 9's in 56, and how many over?

How many 5's in 56, and how many over?

How many 10's in 56, and how many over?

Find the value of:

$12 \div 6$	4×7	$\frac{1}{6}$ of 60	$60 = 7 \times 8 + (\ )$.
$30 \div 6$	6×8	$\frac{2}{6}$ of 60	$53 = 10 \times 5 + (\ )$.
$48 \div 6$	7×7	$\frac{3}{6}$ of 60	$54 = 7 \times 7 + (\ )$.
$42 \div 6$	4×8	$\frac{1}{2}$ of 60	$58 = 8 \times 7 + (\ )$.
$54 \div 6$	3×9	$\frac{1}{7}$ of 21	$55 = 6 \times 9 + (\ )$.
$36 \div 6$	5×8	$\frac{1}{8}$ of 40	$59 = 11 \times 5 + (\ )$.
$24 \div 6$	7×5	$\frac{1}{5}$ of 60	$51 = 8 \times 6 + (\ )$.
$60 \div 6$	5×9	$\frac{2}{5}$ of 60	$52 = 6 \times 8 + (\ )$.

194. Here is a picture of a watch face.

When the pointer in the little circle has gone round once, how many minutes have passed?

The little circle is divided into how many spaces?

Sixty seconds make a minute.

When the longer hand in the large circle has gone round once, what time has passed?

Into how many spaces is the large circle divided?

Sixty minutes make an hour.

Which is the hour-hand? Which the minute-hand? The second-hand?

How often does the hour-hand go round from midnight to midnight?

Then how many hours make a day?

What time of day is shown on the watch-face?

How many minutes in a half of an hour? In a quarter of an hour?

What part of an hour are 30 minutes? 15 minutes? 10 minutes?

From noon to midnight is what part of 48 hours?

In half a minute how many seconds?

What part of a minute are 15 seconds? 10 seconds? 6 seconds?

In what time does the hour-hand go round four times?

How many hours in a half of a day?

How many hours is it from 6 A. M. on Monday till 6 A. M. on Tuesday?

195. How much money will buy 10 pounds of sugar at 6 cents a pound?

Five boys bought a ball for 50 cents. No one gave more money than another. How much did each give?

In 8 weeks there are —— days.

We had 48 eggs on Sunday. On Monday we got a dozen more. How many eggs had we then? How many dozens?

9 quarts of milk at 6 cents a quart will cost —— cents.

Maud had 11 nickels. She gave 50 cents for a doll, and had —— cents left.

A house is 30 feet long and 18 feet wide. What is the distance around the house?

A rug is 9 feet long and 6 feet wide. It contains —— square feet, or —— square yards.

There are 52 weeks in a year. How many weeks in half a year?

A bushel of wheat weighs 60 pounds. What is the weight of a peck? A half-bushel?

Six windows contain 48 panes of glass. How many panes are there in each window?

If each of 7 boys makes 8 balls of snow, how many will they have together?

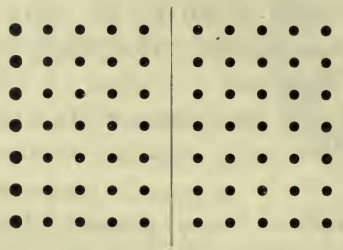
Roy borrowed 60 cents from his brother, and paid him back 6 cents of it every week. How many weeks did it take to pay the whole?

If a man works 8 hours a day, what part of the day does he work?

If a horse walks a mile in 15 minutes, how many miles at that rate will he walk in an hour?

If a railway train runs one mile in 2 minutes, how many miles will it go in an hour?

Numbers to Seventy.



196. We have —— rows of 10 dots each; there are —— dots in all the rows. 7×10 dots = —— dots.

There are 10 columns of —— dots each. 10×7 dots = —— dots.

We see that there are —— tens or —— sevens in 70.

$70 \div 10 =$ $70 \div 7 =$

The large dots are one —— of the 70 dots. $\frac{1}{10}$ of 70 =

The small dots are nine —— of the 70 dots. $\frac{9}{10}$ of 70 =

On one side of the vertical line there are —— tenths of the 70 dots; on the other side we find $\frac{1}{2}$ of the 70 dots. One side has as many dots as the other. ($\frac{1}{2} = \frac{5}{10}$.)

197. There are —— small dots in the picture—seven rows of —— dots each. 7×9 dots = —— dots.

There are 9 columns of —— dots each. 9×7 dots = —— dots.

We can take 7 small dots away —— times; we can take away 9 small dots —— times.

63 dots $\div$ 7 dots = —— times. 63 dots $\div$ 9 dots = —— times.

Show by a drawing that 9 sevens = 7 nines.

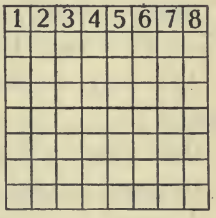
Count by 5's to 70. By 10's. By 7's.

198. Complete and memorize:

1 seven = 7.	1 × 7 = 7.	7 × 1 = 7.
2 sevens =	2 × 7 =	7 × 2 =
3 sevens =	3 × 7 =	7 × 3 =
4 sevens =	4 × 7 =	7 × 4 =
5 sevens =	5 × 7 =	7 × 5 =
6 sevens =	6 × 7 =	7 × 6 =
7 sevens =	7 × 7 =	7 × 7 =
8 sevens =	8 × 7 =	7 × 8 =
9 sevens =	9 × 7 =	7 × 9 =
10 sevens =	10 × 7 =	7 × 10 =

199. 7 dots are contained in 21 dots —— times.
7 days are contained in 70 days —— times.
7 pints are contained in 35 pints —— times.
7 yards are contained in 63 yards —— times.
9 sq. ft. are contained in 36 sq. ft. —— times.
9 eggs are contained in 63 eggs —— times.
7 pounds are contained in 66 pounds —— times, and 3 pounds over.

200. Here is a square. How many small squares in the upper row? How many rows?



8 × 8 squares = —— squares.

How many times can 8 squares be found in the 64 squares?

In one-half of the large square how many small squares?

½ of 64 squares = —— squares.
64 squares ÷ 2 = —— squares.
64 squares ÷ 8 = —— squares.

The upper row is what part of the large square?

How many eighths of the large square are on each side of the dark line?

$\frac{1}{8}$ of 64 squares = —— squares.

$\frac{4}{8}$ of 64 squares = —— squares.

201. Find the value of:

$14 \div 7$	7×6	$\frac{1}{2}$ of 64	$64 = 9 \times 7 + (\ )$.
$28 \div 7$	9×5	$\frac{1}{4}$ of 64	$62 = 7 \times 8 + (\ )$.
$35 \div 7$	8×7	$\frac{2}{4}$ of 64	$69 = 8 \times 8 + (\ )$.
$21 \div 7$	7×9	$\frac{1}{10}$ of 70	$68 = 7 \times 9 + (\ )$.
$70 \div 7$	8×8	$\frac{3}{10}$ of 70	$61 = 8 \times 7 + (\ )$.
$42 \div 7$	6×7	$\frac{5}{10}$ of 70	$67 = 10 \times 7 - (\ )$.
$49 \div 7$	9×6	$\frac{9}{10}$ of 70	$65 = 6 \times 10 + (\ )$.
$56 \div 7$	6×8	$\frac{1}{7}$ of 70	$66 = 7 \times 10 - (\ )$.
$63 \div 7$	9×7	$\frac{3}{7}$ of 70	$70 = 8 \times 8 + (\ )$.

202. In 10 weeks there are —— days.

Tom has 65 cents. How much more than 50¢ is that?

Maria has 40 cents and Martha has a quarter. How much have they both?

At 8 cents a quart how much will 8 quarts of chestnuts cost?

How much will 3 yards of wire cost at 7 cents a foot?

10 cents is $\frac{1}{2}$ of my money. How much have I?

A nickel is $\frac{1}{4}$ of my money. How much have I?

I gave $\frac{1}{10}$ of my money for a 5-cent stamp. How much had I?

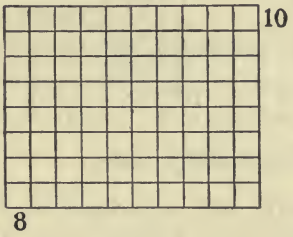
7 children give 9 cents each to a Children's Aid Society. How much money is given by all together?

In a school-room there are 63 seats arranged in 7 rows. How many seats in each row?

Robert has 56 cents. How many quarts of peanuts can he buy at 7 cents a quart?

How old is a man who has lived 3 score and 10 years?

Numbers to Eighty.



203. How many squares in this rectangle? How many rows of 10 squares each? How many columns of 8 squares each? $8 \times 10 =$ $10 \times 8 =$

Find how many squares in 9 columns. $9 \times 8 =$ $8 \times 9 =$

How often do 80 squares contain 10 squares? $80 \div 10 =$

How many times are 8 squares contained in 80 squares?

How many tens make 80? How many tens make $\frac{1}{2}$ of 80?

$\frac{1}{10}$ of 80 = $\frac{1}{8}$ of 80 =

How many 8's make 80? How many 8's make $\frac{1}{2}$ of 80?

Which is more, $\frac{5}{10}$ of 80 or $\frac{1}{2}$ of 80?

Make 6 rows of 12 dots each, and tell how many six 12's are. $12 \times 6 =$

Show that $9 \times 8 = 6 \times 12$.

In 50 there are —— 5's; in 25 there are ——5's.

Count by 6's to 78. By 7's to 77.

Count by 8's to 80. By 5's to 80.

204. Complete and memorize:

1 eight $= 8$	$1 \times 8 = 8$	$8 \times 1 = 8$
2 eights $=$	$2 \times 8 =$	$8 \times 2 =$
3 eights $=$	$3 \times 8 =$	$8 \times 3 =$
4 eights $=$	$4 \times 8 =$	$8 \times 4 =$
5 eights $=$	$5 \times 8 =$	$8 \times 5 =$
6 eights $=$	$6 \times 8 =$	$8 \times 6 =$
7 eights $=$	$7 \times 8 =$	$8 \times 7 =$
8 eights $=$	$8 \times 8 =$	$8 \times 8 =$
9 eights $=$	$9 \times 8 =$	$8 \times 9 =$
10 eights $=$	$10 \times 8 =$	$8 \times 10 =$

205. Find how many times:

8 squares are contained in 24 squares.
8 squares are contained in 40 squares.
8 squares are contained in 72 squares.
9 squares are contained in 72 squares.
6 pegs are contained in 66 pegs.
7 days are contained in 77 days.
8 pounds are contained in 64 pounds.

206. Find the value of:

$16 \div 8$	5×7	$\frac{1}{3}$ of 36	$75 = 7 \times 10 + (\ )$
$32 \div 8$	4×9	$\frac{2}{3}$ of 36	$72 = 9 \times 8 + (\ )$
$40 \div 8$	6×8	$\frac{1}{5}$ of 40	$76 = 8 \times 9 + (\ )$
$80 \div 8$	7×9	$\frac{2}{5}$ of 40	$71 = 8 \times 8 + (\ )$
$72 \div 8$	8×8	$\frac{3}{5}$ of 40	$74 = 50 + 20 + (\ )$
$24 \div 8$	6×7	$\frac{1}{4}$ of 44	$79 = 40 + 25 + (\ )$
$48 \div 8$	9×8	$\frac{3}{4}$ of 44	$77 = 7 \times 10 + (\ )$
$64 \div 8$	8×7	$\frac{1}{2}$ of 80	$73 = 50 + 14 + (\ )$
$56 \div 8$	7×7	$\frac{1}{4}$ of 80	$78 = 7 \times 11 + (\ )$

TRIANGLE SQUARE RECTANGLE HEXAGON

207. If each side of the triangle is an inch long, what is the distance around the triangle? (The distance around it is called the *perimeter.*)

How many sides make the perimeter of the square?

What is the perimeter of a square inch?

A table is 2 feet square. The perimeter is —— feet.

If the rectangle is 1 inch long and ½ inch wide, its perimeter is —— inches.

How many sides has the hexagon? If each side is half an inch long, the perimeter is —— half inches, or —— inches.

A rectangle is 3 feet long and 2 feet wide. What is the perimeter?

The perimeter of a square is 4 feet. What is the length of a side? What is the figure called?

The perimeter of a triangle is 15 feet. One side is 8 inches, another is 5 inches. How long is the third side?

Find the perimeter of this room. Of this table.

Find the perimeter of a room 16 feet long and 16 feet wide.

208. In 8 dimes there are —— cents.

I gave 50¢ for a book and 22¢ for a slate. How much did I give for both?

Mattie had 8 dimes. She gave 5 cents for candy, and then had —— cents left.

A bushel of wheat weighs 60 pounds. A bushel and a peck weigh —— pounds.

How many gallons must be added to 65 gallons to make 78 gallons?

If I have 70 cents, to how many boys can I give a dime each?

Uncle Henry is 50 years old. How old will he be in 24 years?

The perimeter of a square is 12 inches. Draw the square and show how many square inches it contains.

If you had 65 cents and each of 5 boys gave you 2 cents, how many cents would you have?

Wilbur earns 53 cents in a day and Oscar 44 cents. How much more does Wilbur earn than Oscar in 8 days?

Numbers to One Hundred.

209. Draw a square 9 inches on a side. Mark it off into square inches.

How many squares inches are there? How many in 1 row? How many rows?

9×9 square inches $=$ —— squares inches.

81 square inches contains 9 square inches —— times.

10×9 sq. in. $=$ —— sq. in. $\quad 9 \times 10 =$

$90 \div 10 = \quad 90 \div 9 = \quad \frac{1}{10}$ of $90 =$

Make 7 rows of 12 dots each, and tell how many seven 12's are. How many are twelve 7's?

How many 12's make 84? How many 7's?

Add by 7's to 84. By 8's to 96. By 9's to 99. By 10's to 100.

Write a number which has 9 in the ones' place. Can you write a number which has *ten* in the ones' place?

What is the smallest number that is written with two figures?

What is the largest number that can be expressed by two figures?

210. Complete and memorize:

1 nine = 9	1 × 9 = 9	9 × 1 = 9
2 nines =	2 × 9 =	9 × 2 =
3 nines =	3 × 9 =	9 × 3 =
4 nines =	4 × 9 =	9 × 4 =
5 nines =	5 × 9 =	9 × 5 =
6 nines =	6 × 9 =	9 × 6 =
7 nines =	7 × 9 =	9 × 7 =
8 nines =	8 × 9 =	9 × 8 =
9 nines =	9 × 9 =	9 × 9 =
10 nines =	10 × 9 =	9 × 10 =
11 nines =	11 × 9 =	9 × 11 =

Multiply 10 by 3, 7, 5, 4, 8, 6, 9, 10.

How many 10's in 50, 30, 70, 90, 60, 100?

How many 9's in 36, 45, 63, 72, 90, 81?

How many 8's in 40, 56, 64, 80, 72, 88, 96?

211. Find the value of:

90 ÷ 9	80 ÷ 10	77 ÷ 7	72 ÷ 9
36 ÷ 9	60 ÷ 10	63 ÷ 7	64 ÷ 8
63 ÷ 9	30 ÷ 10	84 ÷ 7	56 ÷ 7
45 ÷ 9	90 ÷ 10	66 ÷ 6	54 ÷ 6
54 ÷ 9	88 ÷ 11	72 ÷ 6	49 ÷ 7
72 ÷ 9	99 ÷ 11	88 ÷ 8	42 ÷ 6
81 ÷ 9	84 ÷ 12	96 ÷ 8	60 ÷ 12
99 ÷ 9	96 ÷ 12	72 ÷ 8	72 ÷ 12

212. How many 10-cent dishes can I buy for a dollar?

A bath room is 9 feet square. It contains —— square feet.

Mr. Hall has 12 bushels of turnips. To how many persons can he sell 1 peck each?

A milkman has 9 gal. 1 qt. of milk. He can sell 1 qt. to each of —— customers.

What are 7 dozen eggs worth at a cent apiece?

How many days are there in 11 weeks?

Twelve men paid 2 dollars apiece to hire a sail boat. How much did they all pay?

If a boy's suit costs 9 dollars, how much will 10 such suits cost?

A man paid 81 dollars for a horse and $\frac{1}{9}$ as much for a saddle. How much did the saddle cost him?

If the whole of anything costs 81 cents, how much does $\frac{2}{9}$ of it cost?

At his last birthday Edward had lived 96 months. How many years old was he?

Add the days in the month in which Thanksgiving comes to those in the month after and the month before.

Slate Work.

213. How many dollars are \$32 and \$32 and \$32, or $3 \times \$32$?

\$32	\$32
\$32	3
\$32	\$96
\$96	

Three times 2 ones are 6 ones. Write the 6 in ones' place. Three times 3 tens are 9 tens. Where do we write the 9?

Multiply:

42	23	34	31	44	21	32
2	3	2	3	2	3	2

The perimeter of a square room is 48 feet. What is the length of each side?

4) 48 feet
12 feet

Each side is $\frac{1}{4}$ of the perimeter. $\frac{1}{4}$ of 4 tens is 1 ten, and $\frac{1}{4}$ of 8 ones is 2 ones. $\frac{1}{4}$ of 48 feet is 12 feet.

Find $\frac{1}{4}$ of \$84, $\frac{1}{3}$ of 66 yd., $\frac{1}{2}$ of 46 gal., $\frac{1}{3}$ of 96¢.

How many 3's in 36?

3) 36
10
2
12

3) 36
12

In 3 tens there are 10 threes. In 6 ones there are 2 threes. 10 threes and 2 threes are 12 threes.

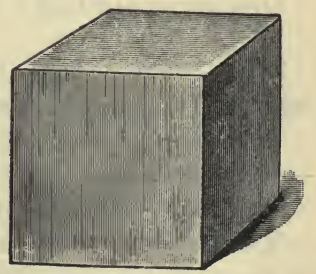
Find how many:

2's in 28. 3's in 63. 4's in 48.
3's in 96. 4's in 88. 2's in 84.

Divide:

2) 68	3) 69	2) 64	4) 44	5) 55	7) 77
2) 86	3) 96	9) 99	4)88	6) 66	8) 88

214. This is a cube. How many sides, or faces, has it?



What is the length of each face? The width?

Are the faces all of the same size? Each face is a —— inch.

A cube that is an inch long, an inch wide, and an inch thick is called a *cubic inch* (cu. in.).

Find a block that is a cubic inch.

Place 4 such blocks in a row. How many cubic inches in the row?

Place 4 more cubes beside these. How many cubic inches in the 2 rows?

Place 8 more cubes on top of these. How many cubic inches in each layer? How many in both layers?

215. With one-inch cubes build a cube 2 inches on each side.

How many layers are there? How many rows in each layer? How many one-inch cubes in each row?

How many cubes in both rows? In both layers?

How many cubic inches in the cube you have built?

A cube 2 inches on a side is a two-inch cube. It contains —— cubic inches.

A one-inch cube is what part of a two-inch cube?

A two-inch cube is how many times a one-inch cube?

Point out $\frac{1}{4}$ of a two-inch cube. $\frac{1}{2}$ of it.

How many fourths of the two-inch cube equal $\frac{1}{2}$ of it?

How many eighths of the two-inch cube equal $\frac{1}{4}$ of it?

One-fourth is what part of one-half?

One-half of one-half is one ——.

216. Build a cube having 3 layers, 3 rows in each layer, and 3 one-inch cubes in each row.

This cube is —— inches on each side, and contains —— cubic inches.

It is a three-inch cube and contains —— one-inch cubes.

Nine one-inch cubes are what part of the 3-inch cube? 18 one-inch cubes are what part?

How many square inches in each face of the 3-inch cube? In 3 faces? In all the faces?

How many inch cubes will be needed to make a pile 6 in. long, 3 in. wide, and 2 in. high?

Review and Drill Work.

217.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
1.	4	8	7	4	9	6	8	5	4	7	6	8	9	6
2.	7	4	8	6	2	5	2	7	8	4	5	3	2	7
3.	5	6	7	8	7	4	6	4	3	5	7	8	9	6
4.	6	5	4	3	5	7	5	6	8	7	5	4	2	4
5.	8	4	5	6	4	5	7	3	4	3	8	9	8	8
6.	4	6	8	7	6	4	3	8	7	9	5	4	6	7
7.	6	7	9	4	8	7	8	5	6	2	8	7	5	6
8.	9	5	6	8	7	6	5	4	5	6	7	8	6	8

Add the numbers in each line.

Add the numbers in each column.

Multiply the numbers in each column by 3, 4, 5, 6, 7, 8, 9.

Multiply the numbers in column *h* by 8, and those in column *m* by 7, and find the sums and differences of each two corresponding results.

218. Complete:

$12 \div 2 =$	$49 \div 7 =$	$42 \div 6 =$	$63 \div 9 =$
$32 \div 4 =$	$48 \div 8 =$	$27 \div 3 =$	$54 \div 9 =$
$60 \div 5 =$	$84 \div 7 =$	$28 \div 4 =$	$81 \div 9 =$
$15 \div 3 =$	$18 \div 3 =$	$40 \div 4 =$	$56 \div 7 =$
$54 \div 9 =$	$33 \div 3 =$	$63 \div 7 =$	$84 \div 12 =$
$21 \div 3 =$	$64 \div 8 =$	$72 \div 8 =$	$45 \div 3 =$

219. How many —

yards in 30 ft.?
pecks in 24 qt.?
feet in 96 in.?
bushels in 32 pk.?
weeks in 49 days?
ounces in 2 lb.?
quarts in 48 pt.?
dimes in 33¢?
dimes in 90¢?
gallons in 28 qt.?
dollars in 30 dimes?
pints in 44 qt.?
yards in 27 feet?
half-pecks in 2 bu.?
shoes in 30 pairs?
tens in 35 ones?

220. Find the cost of:

9 lb. of sugar at 6¢ a pound.
4 quires of paper at 10¢ a quire.
8 qt. of peanuts at 6¢ a quart.
9 yd. of silk at $4 a yard.
1 dozen papers at 3¢ each.
2 bu. of salt at 4¢ a quarter-peck.

221. Find the perimeter and area of:

A rectangle, 7 inches by 4 inches.
A rectangle, 8 inches by 3 inches.
A rectangle, 9 inches by 4 inches.
A rectangle, 12 inches by 5 inches.
A square, measuring 3 inches on a side.
A square, measuring 4 inches on a side.

222. Take inch cubes and build a pile 4 blocks long, 3 blocks wide, and 2 blocks high. Then fill out the following:

Length of one side = —— inches.
Height of one side = —— inches.
Area of one side = —— sq. in.
Width of one end = —— inches.
Area of one end = —— sq. in.
Area of the top = —— sq. in.
Area of all six sides = —— sq. in.
Number of cubes in the pile = ——.

223. Draw a square that contains 49 square inches.

Draw a rectangle that contains 30 square inches.

James is 10 years old. His age is $\frac{1}{5}$ of his father's age. How old is his father?

When oil is worth 20 cents a gallon, how much can be bought for 5 cents?

If you take 2 quarts of milk a day at 6¢ a quart, how much will your milk cost you for a week?

How much must you pay if you buy 7 yards of cloth at 9¢ a yard?

If there are 4 sq. in. in the face of a cube, how many square inches are there in all the faces?

24 sheets of paper make a quire. Find how many sheets there are in a quire and a half of a quire.

Name all the months of the year that have 31 days.

From 7 o'clock in the morning until nine o'clock in the evening is how many hours?

If your oil can holds 2 gal. and your lamp holds 2 quarts, how many times can you fill your lamp from your can?

Show by lines that $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$ are the same in value.

Hundreds.

one ten hundred

224. How many ones make 1 ten? How many tens make 1 hundred?

Show me 10 tens with splints. Put a band around them. How many ones are in the bundle?

Make another bundle of 100. How many ones are in both bundles? How many hundreds?

One hundred and 4 hundreds are —— hundreds.

Four hundreds and 5 hundreds are —— hundreds.

How many cents make 1 dime? How many dimes make a dollar? How many cents make a dollar?

One hundred cents make a dollar.

How many cents in 5 dollars? In 8 dollars?

In what place, counting from the right, do we write the figure for the number of *tens?*

In what place do you think we should write the *hundreds* of a number?

225. Supply the figures needed:

One hundred is written thus — 100.
Two hundred is written thus — 200.
Three hundred is written thus —

Four hundred is written thus —
Five hundred is written thus —
Six hundred is written thus —
Seven hundred is written thus —
Eight hundred is written thus —
Nine hundred is written thus —
Ten hundred is written thus — 1000. *One thousand.*

226. Copy and complete:

10 tens make 100.
20 tens make ——.
30 tens make ——.
40 tens make ——.
50 tens make ——.
60 tens make ——.
80 tens make ——.
70 tens make ——.
90 tens make ——.
100 tens make ——.

100 = 10 tens.
500 = —— tens.
300 = —— tens.
400 = —— tens.
200 = —— tens.
600 = —— tens.
800 = —— tens.
700 = —— tens.
900 = —— tens.
1000 = —— tens.

227. Add:

$5	500¢	$4	400¢
3	300¢	5	500¢

4 hundreds	40 tens	400 ones
3 "	30 "	300 "

100 miles	200 sheep	$100
300 "	400 "	600
500 "	300 "	200

228. Subtract:

\$6	600¢	60 dimes
\$2	200¢	20 "

7 hundreds	70 tens	700 ones
3 "	30 "	300 "

900	700	600	800	900
200	400	100	500	700

229. Copy and complete:

$100 + 300 =$	$500 + 100 =$	$300 + 600 =$
$200 + 400 =$	$400 + 300 =$	$500 + 400 =$
$400 + 200 =$	$700 + 200 =$	$100 + 800 =$
$600 + 300 =$	$100 + 600 =$	$300 + 500 =$
$300 + 200 =$	$200 + 500 =$	$400 + 600 =$

Hundreds and Tens.

t	*o*
1	0

h	*t*	*o*
1	0	0

h	*t*	*o*
1	1	0

230. In writing *ten* in figures, why do we put 0 in ones' place?

In writing *one hundred* in figures we put 0 in two places. Why?

How many ones can be written with one figure? How many tens? How many hundreds?

How do you write 1 ten and 1 one in figures?

How do you think 1 hundred and 1 ten should be written?

One hundred and one ten is written thus — 110.
One hundred and two tens is written thus — 120.
One hundred and three tens is written thus — 130.
One hundred and ten tens is written thus — 200.
Two hundreds and one ten is written thus — 210.
Three hundreds and five tens is written thus — 350.

231. Copy and complete:

1 hundred + 1 ten = 110.	1 hundred + 9 tens =
1 hundred + 3 tens =	2 hundreds + 3 tens =
1 hundred + 7 tens =	2 hundreds + 6 tens =
1 hundred + 5 tens =	2 hundreds + 5 tens =
1 hundred + 4 tens =	3 hundreds + 1 ten =
1 hundred + 8 tens =	3 hundreds + 4 tens =
100 + 80 =	300 + 40 =

One hundred and two tens, or 120, is read *one hundred twenty.*

How then should 140 be read? 250? 230? 360? 510? 740?

Count by 10's from 100 to 300. From 300 to 500. From 500 to 1000.

How many hundreds and how many tens in 240? In 360? In 580?

232. Copy and complete:

$260 = 2\,h + 6\,t$	$430 = 4\,h + 3\,t$
320 =	680 =
410 =	740 =
630 =	590 =
540 =	860 =
720 =	770 =
810 =	990 =
950 =	870 =

What number contains 4 hundreds and 3 tens? Two hundreds and 5 tens?

Count by 10's from 300 to 600, and write the numbers as you count.

Show with sticks what is expressed by each figure in 140. In 250.

How many tens in 100? In 200? In 500? In 250? In 120? In 210?

233. Read:

150, 180, 210, 320, 430, 540, 360,
280, 470, 390, 760, 920, 650, 870.

234. Write in figures:

One hundred forty.	Four hundred fifty.
One hundred sixty.	Six hundred ten.
Two hundred thirty.	Eight hundred seventy.
Two hundred twenty.	Seven hundred eighty.
Three hundred eighty.	Nine hundred forty.
Five hundred ninety.	Nine hundred ninety.

Hundreds, Tens, and Ones.

h	*t*	*o*
1	0	1

h	*t*	*o*
1	2	4

235. In writing 1 hundred and 1 one, or 1 more than 100, what do we write in the ones' place? In the tens' place?

In writing 124 what do we write in ones' place? In tens' place?

Count from 100 to 200, and write the numbers as you count.

Numbers from 100 to 1000 are written as follows:

One hundred,	100.
One hundred one,	101.
One hundred two,	102.
. . . . .	
Two hundred one,	201.
Two hundred twelve,	212.
Two hundred forty-six,	246.
. . . . .	
Nine hundred ninety-nine,	999.
One thousand,	1000.

How many hundreds in 132? How many tens? How many ones?

How many hundreds, tens, and ones in 245? In 328? In 612?

236. Read:

25	42	30	90	81
325	542	130	290	781
16	23	17	84	10
216	423	217	484	810
37	66	36	3	98
437	666	336	303	898

237. Write in figures:

Forty-one.	Eleven.
Two hundred forty-one.	Five hundred eleven.
Sixty-four.	Thirty-six.
Six hundred sixty-four.	Three hundred thirty-six.
Eighty-nine.	Ninety.
Four hundred eighty-nine.	Nine hundred ninety.

238. Copy and complete:

Hundreds	tens	ones			
1	+ 3	+ 2	= 132.	100 + 30 + 2	= 132
1	+ 2	+ 5	=	100 + 20 + 5	=
2	+ 1	+ 6	=	200 + 10 + 6	=
2	+ 4	+ 7	=	200 + 40 + 7	=
5	+ 3	+ 8	=	500 + 30 + 8	=
4	+ 5	+ 0	=	300 + 60 + 4	=
6	+ 6	+ 6	=	400 + 40 + 4	=
8	+ 3	+ 9	=	700 + 80 + 1	=
3	+ 0	+ 5	=	600 + 20 + 0	=
9	+ 7	+ 1	=	800 + 0 + 8	=

Dollars	dimes	cents	cents	Dollars	dimes	cents	cents
1 +	5	+ 5	= 155	2	+ 3	+ 1	= 231
1 +	4	+ 2	=	3	+ 5	+ 4	=
3 +	2	+ 8	=	5	+ 7	+ 5	=
4 +	6	+ 0	=	6	+ 9	+ 0	=
2 +	0	+ 5	=	7	+ 0	+ 8	=
5 +	0	+ 0	=	4	+ 4	+ 4	=

In 325 cents, the 5 represents *cents*, the 2 represents *dimes*, and the 3 represents *dollars*, or *hundreds* of cents.

What does each figure in 427 cents represent?

In 555 cents, which five represents the greatest value? Which represents the least value?

Which 5 represents 50 cents? Which represents 5 cents?

Then the middle 5 represents 10 times as much as which 5?

Which 5 represents 10 times as much as the middle 5?

Show how many dollars, dimes, and cents there are in 215 cents.

How many hundreds, tens, and ones are there in 348? In 592? In 402?

How many figures are needed to write hundreds? How many to write hundreds, tens, and ones?

Addition and Subtraction.

239. Add:

1	2	3	4	5	6
24	92	57	68	90	27
87	87	86	94	76	46
68	69	75	76	84	84
96	34	68	45	59	68

7	8	9	10	11	12
49	94	84	65	7	92
74	87	76	29	84	37
98	39	18	84	68	48
65	65	54	76	42	51
83	56	63	17	79	76

13	14	15	16	17	18
28	81	63	37	97	28
46	63	81	96	2	84
92	9	5	42	85	61
74	27	37	88	46	79
19	45	19	4	58	46
37	76	46	73	39	37

19	20	21	22	23	24
76	64	95	76	12	74
32	93	26	90	37	29
23	89	7	39	45	83
67	46	80	68	79	28
51	57	78	85	28	45
24	54	38	42	55	45
36	36	47	36	84	83
45	79	62	7	83	37

240. Subtract 286 from 753.

753
286
467

We cannot take 6 ones from 3 ones, so we add 10 ones to the 3 ones, and take 6 from 13. Where do we get the 10 ones? How many tens are left?

Can we take 8 tens from 4 tens? Then we must add 10 tens to the 4 tens, and take 8 from 14. Where do we get the 10 tens? How many hundreds are left? 2 hundreds from 6 hundreds leaves 4 hundreds.

Add 467 and 286. If the sum is 753, the subtraction is correct.

Subtract and prove:

1	2	3	4	5	6
714	635	582	745	827	610
362	271	175	476	572	247

7	8	9	10	11	12
921	824	732	672	523	624
473	547	435	48	149	258

13	14	15	16	17	18
362	521	607	300	815	935
57	412	278	27	726	786

19	20	21	22	23	24
872	360	706	982	617	308
375	97	418	387	419	199

241. Copy and complete:

1. 475+65=
2. 582+78=
3. 368+53=
4. 729+94=
5. 647+85=
6. 768+74=
7. 526+59=
8. 395+67=
9. 248+376=
10. 426+187=
11. 519+183=
12. 372+439=
13. 582+276=
14. 766+180=
15. 647+273=
16. 504+396=
17. 527—348=
18. 716—297=
19. 432—186=
20. 666—378=
21. 500—275=
22. 807—508=
23. 431—276=
24. 760—498=

242. 1. How much will a span of horses cost if one horse costs 85 dollars and the other 105 dollars?

2. In a box were 85 oranges. If the box would hold 125, how many more oranges would it take to fill it?

3. A boy shoots one arrow 97 yards up the road, and another 65 yards down the road. How many yards apart are the two arrows?

4. Mr. Thomas paid $625 for a lot, and sold it for $900. How much did he make?

5. Three men have $980. One has $145, another has $321. How much has the third man?

6. I can buy a candy store for $825, but I have only $688. How much more do I need?

7. Mr. Johnson raised 345 bushels of corn, 475 bushels of oats, and 128 bushels of wheat. He raised —— bushels in all.

8. One week a milkman sold 284 qt. of milk, the next week 296 qt., the next week 318 qt., and the next week 72 qt. In the four weeks he sold —— quarts.

9. Martin weighs 128 lb., Frank 96 lb., Jack 116 lb., Rob 87 lb., and Will 131 lb. How much do all five boys weigh?

10. A storekeeper had 970 bushels of potatoes. One week he sold 265 bu., and the next week 325 bu. How many bushels had he left?

11. On Monday morning a freight train started to run 962 miles. The first day it ran 316 miles, the second day it ran 373 miles. It still had —— miles to run.

12. September, April, June, and November each has 30 days. February has 28 days except in leap years, when it has 29. All other months have each 31 days. How many days in all the months, or in a year?

Multiplication and Division.

243. Multiply:

243	321	434	233	212
2	3	2	3	4
211	322	423	534	412
5	4	3	2	4

Take 46 splints, 4 tens and 6 ones. How many would you have if you had 4 times as many?

Four times 6 splints = 24 splints. How many *tens* and how many *ones* in the 24 splints.

Four times 4 *tens* = 16 tens. 16 tens and 2 tens are 18 tens. You would have 18 tens and 4 ones, or 184 splints.

$$\begin{array}{rcl} 46 = & 4\,t + 6\,o \\ 4 & 4 \\ \hline 184 = & 16\,t + 24\,o = 18\,t + 4\,o \end{array}$$

Multiply 246 by 4.

$$\begin{array}{r} 246 \\ 246 \\ 246 \\ 246 \\ \hline 984 \end{array} \qquad \begin{array}{rcl} 246 = & 2\,h + 4\,t + 6\,o \\ & 4 \\ \hline 984 = & 9\,h + 8\,t + 4\,o \end{array}$$

We can find the result by adding, but there is a snorter process. 4 times 6 ones = 24 ones. We write the 4 ones under the 6 ones, and "carry" the 2 tens to add with the tens. 4 times 4 tens = 16 tens. The 2 ones we had to carry make 18 tens, or 1 hundred and 8 tens. We write the 8 tens under the 4 tens, and carry the 1 hundred. 4 times 2 hundreds are 8 hundreds and the 1 hundred makes 9 hundreds. Where is the 9 hundreds written?

Multiply:

1	2	3	4	5	6
45	36	25	35	143	125
3	4	5	3	4	5
7	8	9	10	11	12
216	117	228	170	280	181
4	5	3	2	3	4

13	14	15	16	17	18
242	162	136	172	196	167
5	6	6	5	4	5

19	20	21	22	23	24
152	138	126	119	137	128
6	7	8	7	7	7

25	26	27	28	29	30
108	107	117	163	69	76
8	9	8	6	8	9

31	32	33	34	35	36
35	24	32	51	62	44
12	12	11	11	12	12

244. Examine carefully:

5 multiplied by 10 = 50.	10 × 7 = 70.
8 multiplied by 10 = 80.	10 × 2 = 20.
10 multiplied by 10 = 100.	10 × 9 = 90.
12 multiplied by 10 = 120.	10 × 20 = 200.
15 multiplied by 10 = 150.	10 × 50 = 500.

Annexing 0 to a number multiplies it by 10.

Announce results at sight:

10 × 7	10 × 25	10 × 60
10 × 11	10 × 30	10 × 66
10 × 14	10 × 36	10 × 70
10 × 18	10 × 40	10 × 75
10 × 20	10 × 48	10 × 87
10 × 24	10 × 50	10 × 98

245. Divide:

(a)	2) 486	2) 682	2) 248	3) 636	3) 369
(b)	4) 844	4) 480	5) 555	6) 660	8) 888
(c)	2) 100	2) 128	3) 126	3) 150	3) 189
(d)	4) 168	4) 204	4) 284	4) 320	4) 368
(e)	5) 105	5) 150	5) 200	5) 355	5) 550
(f)	6) 126	6) 240	6) 366	6) 420	6) 546
(g)	7) 140	7) 217	7) 280	7) 357	7) 630
(h)	8) 160	8) 248	8) 400	8) 560	8) 728
(i)	9) 639	9) 720	9) 810	9) 909	9) 990

246. Examine carefully:

$50 \div 10 = 5$	$120 \div 10 = 12$
$30 \div 10 = 3$	$150 \div 10 = 15$
$80 \div 10 = 8$	$200 \div 10 = 20$
$100 \div 10 = 10$	$250 \div 10 = 25$

Annexing a cipher to a number multiplies that number by 10. Show that cutting off zero *divides* a number by 10.

247. Name results at sight:

$50 \div 10$	$140 \div 10$	$400 \div 10$
$70 \div 10$	$180 \div 10$	$460 \div 10$
$40 \div 10$	$200 \div 10$	$510 \div 10$
$60 \div 10$	$270 \div 10$	$680 \div 10$
$110 \div 10$	$300 \div 10$	$790 \div 10$
$130 \div 10$	$320 \div 10$	$940 \div 10$

248. To find $\frac{1}{5}$ of 75 splints, take 7 tens and 5 ones, and divide them into 5 equal piles. Each pile will contain $\frac{1}{5}$ of the 75. How shall we proceed to make the 5 piles?

5) 75
15

$\frac{1}{5}$ of 7 tens = 1 ten for each pile, but there are 2 tens left out. 2 tens and 5 ones = 25 ones. $\frac{1}{5}$ of 25 ones = 5 ones for each pile. Hence each pile has 1 ten + 5 ones, or 15 splints.

1. Divide 738 by 6.

6) 738
123

7 hundreds ÷ 6 = 1 hundred, and 1 hundred remaining.

The remainder 1 hundred equals 10 tens, which with the 3 tens makes 13 tens.

13 tens ÷ 6 = 2 tens, and 1 ten remaining. 1 ten and 8 ones = 18 ones. 18 ones ÷ 6 = 3 ones.

Explain this division by using splints.

2. Divide 375 by 5.

5) 375
75

Since 3 does not contain 5, we take the 3 hundreds or 30 tens and put them with the 7 tens, making 37 tens. Then 37 tens ÷ 5 = 7 tens, and 2 tens remaining.

The 2 tens or 20 ones put with the 5 ones make 25 ones. 25 ones ÷ 5 = 5 ones.

Divide:

3	4	5	6	7	8
2) 236	2) 112	2) 154	2) 178	2) 192	2) 254
9	**10**	**11**	**12**	**13**	**14**
2) 176	2) 452	2) 634	2) 816	2) 412	2) 630
15	**16**	**17**	**18**	**19**	**20**
3) 168	3) 195	3) 351	3) 642	3) 975	3) 678
21	**22**	**23**	**24**	**25**	**26**
3) 426	3) 753	3) 826	3) 525	3) 432	3) 528

27	28	29	30	31	32
4) 452	4) 896	4) 568	4) 604	4) 720	4) 956
33	**34**	**35**	**36**	**37**	**38**
5) 625	5) 675	5) 720	5) 835	5) 960	5) 985
39	**40**	**41**	**42**	**43**	**44**
6) 132	6) 198	6) 252	6) 618	6) 714	6) 804
45	**46**	**47**	**48**	**49**	**50**
7) 154	7) 112	7) 105	7) 714	7) 798	7) 861
51	**52**	**53**	**54**	**55**	**56**
8) 176	8) 104	8) 256	8) 736	8) 984	8) 992
57	**58**	**59**	**60**	**61**	**62**
9) 117	9) 198	9) 288	9) 657	9) 765	9) 846

249. **1.** What number multiplied by 7 is equal to 84?

2. What number divided by 6 is equal to 72? To 720?

3. Find one of the 4 equal parts of 96. Of 240.

4. Of what number is 25 one-fourth? One-eighth?

5. Fifty is $\frac{1}{6}$ of what number? $\frac{1}{10}$ of what number?

6. If 24 is $\frac{2}{3}$ of some number, what is $\frac{1}{3}$ of the number?

7. If \$20 is $\frac{2}{3}$ of my money, how much money have I?

8. A train runs 315 miles in 9 hours. How far does it run in 1 hour?

9. If 3 organs cost \$180, how much does one cost?

10. If 1 organ costs \$60, how much will 10 cost?

11. At the rate of 2 for 5 cents, what will a dozen lemons cost? (12 = how many 2's?)

12. What will 10 books cost if 2 books cost \$3? 10 is how many times 2? The cost of 10 books will be how many times \$3?

13. If you read 23 pages each day, how many pages will you read in a week?

14. How many boxes will hold 117 pounds of candy, if 3 pounds are put in each box?

15. In a year there are 365 days. How much more than 52 weeks is that?

16. At \$7 a barrel, how many barrels of flour can be bought for \$413?

17. A rectangle is 81 inches long and 7 inches wide. How many square inches does it contain?

18. Three boys have 43 quarts of nuts, and they gather 32 quarts more. If they divide them equally among themselves, how many quarts will each receive?

19. How many inch-cubes can you put into a box that measures in the inside 5 inches long, 4 inches wide, and 3 inches deep?

United States Money.

250. How many cents make a dime?

How many dimes make a dollar?

Then how many cents make a dollar?

10 cents make 1 dime.

10 dimes, or 100 cents, make 1 dollar.

One dollar is written \$1, or \$1.00. The sign \$ is called

the *dollar mark*, and is placed before the figures expressing dollars. Four dollars and twenty-five cents is written $4.25. The dot after the $4 in $4.25 means that the two figures on the right stand for cents, and the figures on the left stand for dollars. This dot is called the *decimal point.*

251. Read the following:

$4.75	$6.20	$8.10	$2.05	$5.05
$4.50	$2.84	$1.90	$3.60	$4.40
$3.25	$7.15	$5.35	$9.01	$8.16

Write the following:

Two dollars and fifty cents. One dollar and twenty-five cents. One dollar. Five dollars and forty cents. Eight dollars and five cents. Ten dollars and seventy-five cents. Six dollars and two cents. Nine dollars and fifteen cents.

252. When there are no *dimes* or *cents* we do not need to use the dot unless we write ciphers in the place of dimes and cents.

Read the following:

$5	$10	$50	$100	$125	$500
$1	$25	$75	$110	$206	$640
$4.00	$2.00	$8.00	$105	$30.00	$75.00

When there are no *dollars* to write we place the dot between the dimes and the dollar mark.

Read the following:

$.25	$.75	$.10	$.01	$.07	$.09
$.50	$.90	$.05	$.20	$.85	$.99

Write in figures:

Thirty dollars. One hundred five dollars. Four hundred ten dollars. Five hundred dollars. Twenty-five cents. Sixty cents. Ten cents. Five cents. Thirty cents. One cent. Eighty-eight cents. Seven cents. Twelve cents. Five dollars and five cents.

253. Write as dollars and cents:

150¢	175¢	225¢	360¢	105¢	310¢
420¢	500¢	713¢	609¢	220¢	666¢

Complete and read:

Dollars	Dimes	Cents	
3	2	5	= $3.25
5	1	6	=
0	7	0	=
2	4	8	=
8	3	0	=
0	0	4	=
4	0	0	=
0	5	2	=
9	6	7	=

254. Dollars, dimes, and cents are added just as hundreds, tens, and ones are added.

Dol.	Dimes	¢	
2	4	5	= $2.45
4	5	8	= 4.58
7	6	0	= 7.60
14	6	3	= $14.63

What is written in the first column? In the second? In the third?

Are the dots all in one column?

How do we get 14 dollars in the sum?

Find the sums:

\$12.15	\$16.52	\$21.45	\$60.76
7.06	5.01	8.72	28.09
8.29	7.75	6.34	7.84
4.80	30.40	5.80	3.63
36.94	28.89	10.10	5.00

Find the differences:

\$84.75	\$70.20	\$37.00	\$64.03
26.38	8.05	25.25	28.85

Multiply:

\$14.16	\$15.10	\$12.25	\$24.75
3	4	5	3
\$42.48			
\$51.80	\$42.34	\$28.04	\$37.43
6	5	7	8

Divide:

2) \$48.76	3) \$48.51	2) \$75.20	2) \$25.00
\$24.38			

5¢)75¢	3¢)30¢	8¢)72¢	6¢)96¢	10¢)150¢

255. 1. One month Mr. Gray paid \$22.50 for rent, \$4.80 for milk, \$26.78 for groceries, and \$6.37 for gas. How much did he pay for all?

2. I owe \$32.20 for coal. If I pay \$25 now, how much shall I still owe?

3. A man bought 6 cows at $24.75 each. He paid $—— for all.

4. A dealer paid $112.25 for 5 stoves. What was the price of one?

5. A farmer paid $328 for two horses. He sold one for $197.50, and the other for $187.50. What was his profit?

6. Find the cost of 10 acres of land at $85 an acre.

7. Mrs. Brown gave $320 for 10 cows. How much did she pay for one cow?

8. How many pounds of sugar at 5¢ a pound can you buy for 75¢?

9. If I can buy 2 oranges for 5¢, how many can I buy for a half-dollar?

Oral Exercises.

256. How much money in:

a. 1 5-dollar bill, 3 2-dollar bills, 1 silver dollar, 1 half dollar, and 1 quarter?

b. 1 10-dollar bill, 2 5-dollar bills, 3 silver dollars, 3 quarters, and 2 dimes?

c. 3 20-dollar bills, 6 5-dollar bills, 2 1-dollar bills, 2 half dollar bills, 5 dimes, and 6 nickels?

d. 5 10-dollar bills, 10 2-dollar bills, 1 5-dollar gold piece, 6 half dollars, 8 dimes, and 5 cents?

How many half dollars are there in $2? $5? $10? $12?

How many quarters are there in $2? $3? $5? $10?

How many dimes are there in $2? $3? $5? $15?

How many quarters are there in 2 half dollars? 5 half dollars? 12 half dollars?

How many dimes are there in 2 quarters? 2 half dollars? 6 quarters? 3 half dollars?

How many dimes are there in 30¢? 80¢? 120¢? 250¢? 10 nickels?

How many dollars are there in 20 dimes? 50 dimes? 60 dimes? 75 dimes? 40 nickels? 600 cents?

257. Copy and complete:

$\frac{1}{2}$ of \$1 = 50¢	25¢ = $\frac{1}{4}$ of \$1
$\frac{1}{4}$ of \$1 =	50¢ = —— of \$1
$\frac{3}{4}$ of \$1 =	75¢ = —— of \$1
$\frac{1}{5}$ of \$1 =	20¢ = —— of \$1
$\frac{1}{10}$ of \$1 =	10¢ = —— of \$1

258. *Two dollars and a half* means \$2.50; *a dollar and a quarter* means \$1.25.

Complete and read:

\$1 + $\frac{1}{2}$ of \$1 =	\$4 + $\frac{2}{5}$ of \$1 =
\$2 + $\frac{1}{4}$ of \$1 =	\$7 + $\frac{1}{10}$ of \$1 =
\$5 + $\frac{3}{4}$ of \$1 =	\$6 + $\frac{3}{10}$ of \$1 =
\$3 + $\frac{1}{5}$ of \$1 =	\$9 + $\frac{7}{10}$ of \$1 =

259. Find the amount of this bill:

	6 lb. steak at . . . . . \$ .15 5 yd. silk at . . . . . 1.35 4 gal. milk at . . . . . .30 9 doz. eggs at 14		

260. A lady bought 3 lb. of sugar for 18 cents, and gave the grocer a half dollar. He made the "change" as follows:

Saying 18, he handed her 2¢, and said 20; gave her a nickel, and said 25; then gave her a quarter, and said 50. Did she get the correct change?

Change is usually made by counting up from the amount of the purchase to the amount given in payment.

Find the change by counting up:

Bought candy for 3¢; gave a dime in payment.
Bought sugar for 83¢; gave $1 in payment.
Bought shoes for $3.25; gave $5 in payment.
Bought books for $8.12; gave $10 in payment.

NUMBERS TO MILLIONS.

261. Measure with the quart measure the water in this pail. How many *quarts* are there? *One quart* is called the *unit of measure.*

Measure with a ruler the length of your book. How many inches long is it? What unit of measure did you use?

When we say we have ten apples, the *unit* used in counting them is *one apple.*

One of any kind (or any group *regarded as one*) by comparison with which we count or measure is called a **unit.**

262. You have already learned that when three figures are written side by side, the one at the right represents *ones*, the second figure represents *tens*, and the one at the left represents *hundreds.*

Can you write 10 hundred with three figures?

The number 10 hundred is called *a thousand.*

A thousand is written — 1,000. Then how many figures are required to write thousands?

263. One thousand one hundred is written — 1,100.

Twenty-five thousand is written — 25,000.

Ten thousand five hundred is written — 10,500.

One hundred twenty thousand three hundred is written — 120,300.

How many thousands and how many hundreds in 1,500? 2,600? 8,200? 3,800? 9,300? 18,700? 115,400?

264. One thousand one hundred ten is written—1,110.
One thousand one hundred eleven is written — 1,111.
One thousand twenty-five is written — 1,025.
One thousand four is written — 1,004.

How many thousands and tens in 1,130? 1,480? 2,140? 3,250? 4,890? 7,620? 6,970? 5,710?

How many thousands, hundreds, tens, and ones in 1,235? 1,346? 1,472? 2,125? 3,521? 6,275? 2,017? 12,534?

Write in figures and read all the numbers from 1,002 to 1,020; from 10,995 to 11,001; from 125,090 to 125,160.

265. Complete:

$2{,}743 = 2000 + 700 + 40 + 3 = 2th + 7h + 4t + 3o$
$5{,}271 =$
$1{,}075 =$
$12{,}004 =$
$25{,}378 =$

$3000 + 500 + 60 + 2 = 3th + 5h + 6t + 2o = 3{,}562.$
$6000 + 200 + 70 + 5 =$
$5000 + 800 + 20 + 0 =$
$4000 + 000 + 50 + 4 =$
$8000 + 300 + 00 + 7 =$

266. Compare 1, 10, 100, 1000.

How many ones make 1 ten?
How many tens make 1 hundred?
How many hundreds make 1 thousand?

When 1 stands alone how many ones does it express? When it stands at the left of a cipher? At the left of two ciphers?

In the number 11 which 1 expresses the greater value? How many times as great? In the number 111?

REMEMBER: ***Any figure represents ten times the value it would represent in the next place to the right.***

267. In counting by *ones* the *unit* is *one.*

In counting the *tens* of a number, we may regard *one* ten as the *unit* for the *tens.*

May *one hundred* be regarded as the *unit* for the *hundreds* of a number?

The *ones* of a number are called *units of the first order,* or simply *units;* the *tens* are called *units of the second order;* the *hundreds* are called *units of the third order,* and so on.

268. One more than 999,999 is 1000 thousands, which is called a *million,* and is written thus — 1,000,000.

When we wrote thousands, what did we put after the last figure of the thousands?

Do we place a second *comma* after the figure for millions?

Into groups of how many figures each do the commas divide the figures?

For convenience in reading numbers the figures are divided into groups of three figures each, beginning at the right. Each group is called a *period.* The right-hand group is called the *period of units,* the second group, the period of *thousands,* the third group, the *period of millions.*

269. What we have learned about the manner of writing numbers is shown in the following

TABLE.

Millions	Hundred-thousands	Ten-thousands	Thousands	Hundreds	Tens	Ones
3	8	4	0	5	3	2

3d Period. 2nd Period. 1st Period.

Millions Thousands Units

The number in the table is read *three million, eight hundred forty thousand, five hundred thirty-two.*

Examine the table and tell:

How many figures are required to write ten-thousands? Hundred-thousands?

How many figures are required to write millions?

Are the *tens* and *ones* of each group read together?

How many figures has the left-hand group?

How many figures must the other groups contain?

Each period has three places—ones, tens, and hundreds. The first period has ones, tens, and hundreds of *ones;* the second has ones, tens, and hundreds of *thousands;* and so on.

270. Read the following:

507	101	340	300	999
2,100	1,310	2,136	3,204	5,060
6,400	3,240	1,275	6,308	8,401
12,800	15,890	12,581	16,035	14,008
234,600	616,720	321,476	695,182	999,999
3,005,008	2,452,320	1,982,200	2,879,079	1,121,001

Write in figures:

Two thousand five hundred. Five thousand eight hundred. Four thousand two hundred ten. Six thousand one hundred ninety. Three thousand four hundred forty-six. Eight thousand seven hundred thirty-five. Four thousand three hundred eight. Nine thousand twenty-four. Two thousand ten. Six thousand twenty. Seven thousand five. Ten thousand fifty-eight. Eight thousand two hundred six. One million.

271.

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

You have already learned how numbers are written in the Roman notation up to 12.

Now state what the new letters L, C, D, and M each stand for.

I represents 1; II represents 2; X stands for 10; XX stands for 20. Then what is the effect of repeating a letter?

V stands for 5; IV stands for 4; X stands for 10; IX stands for 9. What then is the effect of writing a letter of less value before a greater?

What does XL stand for? XC?

VI stands for 6; XI stands for 11. What is the effect of writing a letter of less value after a greater?

What does LX stand for? CX?

Complete:

1 = I	11 = XI	21 = XXI	35 = XXXV
2 =	12 =	22 =	45 =
3 =	13 =	23 =	75 =
4 =	14 =	24 =	95 =
5 =	15 =	25 =	34 =
6 =	16 =	26 =	46 =
7 =	17 =	27 =	77 =
8 =	18 =	28 =	88 =
9 =	19 =	29 =	99 =
10 =	20 =	30 =	101 =

Addition and Subtraction.

272. Add:

1	2	3	4	5
3,725	7,618	5,392	6,728	8,796
5,287	4,376	2,763	8,276	6,978
7,392	2,914	4,827	4,937	3,547

6	7	8	9	10
$7,246	$2769	$3486	$16.38	$70.35
3,983	8478	7615	29.15	25.97
2,762	9192	5307	85.72	64.78
6,219	7581	8590	72.40	59.24
8,768	4803	6925	69.17	91.39

11	12	13	14	15
87535	29413	44777	67890	36925
62914	72694	32416	12345	81470
4728	547	87324	34251	14703
872	84062	4715	26076	69258
53389	7618	982	8907	58147
7604	385	5639	73529	3692
5881	92764	76248	982	81470
3627	8270	39571	8076	369
98376	64936	50867	93745	70487

273. Find the sum of:

16. $72384 + 2984 + 37038 + 920 + 8006$.

17. $60572 + 3751 + 807 + 73092 + 46075$.

18. $19283 + 47650 + 2006 + 8372 + 50098$.

19. $53761 + 6807 + 924 + 7354 + 89763$.

20. $40516 + 27385 + 6607 + 4481 + 90876$.

21. Four thousand six, twenty thousand seven hundred fourteen, eighty-nine, five hundred ninety-four, eighty-four thousand nineteen.

274. Subtract:

1	2	3	4	5
7,236	5,176	8,352	6015	9200
4,753	2,849	5,178	2376	2914

6	7	8	9	10
$3520	$7245	$6321	$4000	$8007
1750	2754	4576	2545	7129

11	12	13	14	15
8003	6004	7005	3004	45216
2347	5706	5717	1068	27089

16	17	18	19	20
37002	56214	73014	18001	20450
19008	42657	34025	7608	16784

21	22	23	24
870623	601540	803002	500000
581539	403862	80305	423167

275. The **Minuend** is the number from which another number is subtracted; the **Subtrahend** is the number that is subtracted. What is the *remainder?*

1. The minuend is 825, the subtrahend is 368. Find the remainder.

2. The minuend is 7215, the remainder 2345. What is the subtrahend?

3. The subtrahend is 4527, the remainder is 1328. What is the minuend?

4. To what number must 572 be added to make the sum 1420?

5. If 365 be subtracted from ——, the remainder will be 1824.

276. 1. There are 365 days in a common year. In 10 common years there are —— days.

2. In 1860 there were 177,840 people living in Boston; in 1890, there were 448,477. What was the increase in 30 years?

3. From 1860 to 1890 the population of Baltimore grew from 212,418 to 434,439. Find the gain.

4. In 1890 how much larger was the population of Boston than that of Baltimore?

ILLUSTRATION. $\$5 + \$5 + \$5 + \$5 = \$20$. This is addition. $4 \times \$5 = \$20$. This is multiplication. \$5 is the multiplicand. It is taken 4 times, hence 4 is the multiplier. Which is the product?

The multiplicand and the multiplier are called *factors* of the product. Thus, in $2 \times 5 = 10$, 2 and 5 are factors of 10.

Of what number are 8 and 11 the factors? 5 and 7?

One factor of 21 is 3. What is the other factor?

What is the product of the factors 7 and 9? 10 and 12?

The product is 48, and one factor is 4. What is the other factor?

279. Find the products:

1	2	3	4	5
\$1250	\$2348	\$3176	\$5267	\$24,639
5	3	4	6	5

6	7	8	9	10
6314	5283	7489	36,458	57,926
7	6	7	6	8

11	12	13	14	15
8273	6742	9275	7364	69,078
9	8	8	9	9

16	17	18	19	20
3906	4075	7766	8594	99,888
8	9	7	8	9

21	22	23	24	25
5604	3817	6670	4096	124,762
6	8	9	7	6

26. Multiplier 8, multiplicand 50,725.

27. Multiplicand 23,450, multiplier 7.

280. **1.** If a man earns \$125 a month, how much does he earn in 6 months?

\$125 in one month.
6

\$750 in six months.

In 6 months he earns 6 times \$125, or \$750.

2. A grocer bought 8 barrels of sugar each weighing 284 lb. How many pounds did he buy?

3. Mr. Henry pays \$425 a year for rent. How much does he pay in 3 years?

4. If a teacher is paid \$270 each year, how much is paid in 8 years?

5. How many strokes does a clock strike in 12 hours? In 24 hours? In a week?

6. If a train runs 386 miles a day, how far does it run in 7 days?

7. The distance from Pittsburg to Philadelphia is 354 miles. How many miles does a man travel who makes 2 round trips between the two cities?

8. A man sold 48 bales of cotton, which was $\frac{1}{10}$ of his crop. How many bales had he left?

281. 1. Multiply \$48 by 12.

\$48
12

96 = 2 × \$48
480 = 10 × \$48

\$576 = 12 × \$48

Are 2 times \$48 + 10 times \$48 equal to 12 times \$48?

2. Multiply \$32, \$54, \$66, and \$75 each by 12.

3. Multiply 225 by 15. By 23.

225
15

1125 = 5 × 225
2250 = 10 × 225

3375 = 15 × 225

225
23

675 = 3 × 225
4500 = 20 × 225

5175 = 23 × 225

4. Multiply 314 by 13. By 24.

Find the products:

5.	36×12.	**10.**	124×22.	**15.**	413×18.
6.	45×13.	**11.**	143×25.	**16.**	625×23.
7.	63×15.	**12.**	216×32.	**17.**	842×26.
8.	72×18.	**13.**	244×36.	**18.**	736×33.
9.	88×23.	**14.**	326×43.	**19.**	534×44.

20. Multiply 648 by 164.

648
164

2592 = 4 × 648
38880 = 60 × 648
64800 = 100 × 648

106272 = 164 × 648

648
164

2592
3888*
648

106272

*In multiplying by *tens* it is not customary to put the 0 in ones' place. 60 × 648 = 38880 ones, or 3888 tens.

In multiplying by *hundreds* how many ciphers may we omit? When we multiply by *tens* and omit the 0, in what place does the

first figure of the partial product stand? In what place when we multiply by *hundreds* and omit the two ciphers?

Observe that *the ones, tens, and hundreds of the multiplicand, in order, are multiplied by the ones, tens, and hundreds of the multiplier, in order,* and *that the first figure of each product is put directly under the figure of the multiplier used in obtaining it,* and *that the products are then added.*

282. Multiply:

1	2	3	4	5	6
362	264	218	264	317	364
24	26	32	34	25	37
7	**8**	**9**	**10**	**11**	**12**
523	417	643	527	486	639
44	35	38	46	53	56
13	**14**	**15**	**16**	**17**	
5247	6351	2583	4286	7465	
54	68	65	73	37	
18	**19**	**20**	**21**	**22**	
6304	7023	5230	4076	8276	
36	47	84	63	48	
23	**24**	**25**	**26**	**27**	
325	761	248	691	835	
143	235	534	346	462	
28	**29**	**30**	**31**	**32**	
2317	3465	4263	6375	8729	
324	125	217	264	536	

33. Multiply 325 by 103.

325
103
975
325
33475

If either factor is 0, what is the product?

Multiply 103 by 325 and compare the products.

283. Find the product:

1. 7430×53.	10. 2108×93.	19. 62425×55.
2. 9625×49.	11. 3206×57.	20. 23507×68.
3. 6275×56.	12. 4004×68.	21. 75310×39.
4. 4760×72.	13. 5760×74.	22. 38672×74.
5. 3586×63.	14. 3090×85.	23. 50836×83.
6. 8274×76.	15. 6805×39.	24. 40078×95.
7. 6407×81.	16. 7273×47.	25. 82036×78.
8. 496×237.	17. 638×524.	26. 3726×485.
9. 738×346.	18. 857×432.	27. 4385×724.

284. 1. Multiply 72 by 30.

$$\begin{array}{r} 72 \\ 30 \\ \hline 2160 \end{array} \quad \text{or} \quad \begin{array}{r} 72 \\ 30 \\ \hline 2160 \end{array}$$

Here we multiply by 3 tens and no ones.

Multiply:

2. 74×20.	6. 59×30.	10. 75×80.
3. 48×30.	7. 38×60.	11. 83×70.
4. 65×40.	8. 67×50.	12. 96×90.
5. 142×30.	9. 234×40.	13. 456×150.

285. 1. If a man takes 180 steps a minute, how many steps will he take in an hour?

2. If a train runs 35 miles an hour, how far will it run in 20 hours?

3. How much will 8 months' wages amount to at $27 a month?

4. When you know the cost of one orange, how can you find the cost of 10 oranges?

5. A steamer sails 275 miles a day. How far does she sail in 9 days?

6. In an orchard there are 18 rows and 12 trees in a row. How many trees in the orchard?

7. My parlor is 18 feet square. How many square yards of carpet will it require?

8. How many lines are there on this page of your book? How many on 27 such pages?

9. There are 144 pens in a box. How many pens in 2 dozen boxes?

10. A lot is 175 feet long and 60 feet wide. How many square feet does it contain?

11. There are 28 regiments in an army. If there are 875 men in each regiment, how many men in the army?

12. If a bushel of wheat weighs 60 pounds, what will 150 bushels weigh?

13. An army used 48512 pounds of meat each week. How much was used in 13 weeks?

Find the cost of:

14. 245 dozen fresh eggs at 9¢ a dozen.
15. 384 pounds of sugar at 6¢ a pound.
16. 18 pianos at $275 each.
17. 75 tons of clover hay at $14 a ton.
18. 286 bushels of wheat at 70¢ a bushel.
19. 524 sheep at $4 a head.
20. 4 barrels of molasses, 42 gal. each, at 35¢ a gallon.
21. 65 barrels of apples, 3 bu. each, at 45¢ a bushel.
22. 2 rolls of carpet, 59 yd. each, at 75¢ a yard.
23. 8 loads of coal, 45 bu. each, at 8¢ a bushel.

Division.

286. When we divide one number by another, the result is called the **Quotient**; the number divided is called the **Dividend**; and the number by which we divide is called the **Divisor.**

In multiplication we have two factors to find the product. In division we have a product and one factor to find the other factor. The dividend is the product, the divisor one factor. What is the other factor?

$2 \times \$5 = \$10.$ $\$10 \div 2 = \$5.$ $\$10 \div \$5 = 2.$

Point out the factors in this example. The product. The dividend. The divisors. The quotients.

287. Division includes—

(A). Finding one of the equal parts of a number; as, $\frac{1}{2}$ of $\$10 = \$5.$ $\$10 \div 2 = \$5.$

(B). Finding how many times one number contains another; as, $\$20 \div \$5 = 4.$ $12 \text{ ft.} \div 3 \text{ ft.} = 4.$

1. What is one of the 3 equal parts of \$24?

$$\$24 \div 3 = \$8.$$

2. How many times is \$3 contained in \$24?

$$\$24 \div \$3 = 8.$$

In these examples \$24 is the *dividend.* In the first 3 is the *divisor* and \$8 the *quotient.* In the second \$3 is the divisor and 8 the quotient.

3. When 50 lb. is the dividend and 5 the divisor, what is the quotient?

What is required in this example? Do we also find the number of pounds in each part? Is the quotient of the same kind (pounds) as the dividend?

4. When 40¢ is the dividend and 5¢ the divisor, what is the quotient?

Are the dividend and divisor of the same kind in this example? Does the quotient denote the *number of times* the divisor must be taken to equal the dividend?

5. Find by trial whether the product of the quotient and divisor is equal to the dividend.

6. When \$36 is the dividend and \$4 the quotient, what is the divisor?

7. When \$7 is the divisor and 5 the quotient, what is the dividend?

8. If you have a dozen eggs and wish to give me $\frac{1}{3}$ of them, you must give me one of the 3 equal parts of 12 eggs. That is, you must divide 12 eggs by 3.

9. Divide 30 gallons by 3. By 5. By 6. By 10.

10. What is $\frac{1}{3}$ of 36 feet? $\frac{1}{4}$? $\frac{1}{9}$? $\frac{1}{12}$?

288. Divide:

1	2	3	4	5	6
3) 369	5) 550	6) 126	5) 205	4) 328	6) 426
7	**8**	**9**	**10**	**11**	**12**
4) 368	5) 400	7) 427	6) 540	8) 720	8) 818
13	**14**	**15**	**16**	**17**	**18**
6) 612	7) 714	5) 300	9) 369	8) 808	9) 918

19	20	21	22	23
4) 8044	5) 1050	3) 9126	6) 1206	7)14014

289. Find the quotients:

1.	$3096 \div 3$.	**7.**	$18618 \div 6$.	**13.**	$305100 \div 5$.
2.	$4015 \div 5$.	**8.**	$20515 \div 5$.	**14.**	$180120 \div 3$.
3.	$1421 \div 7$.	**9.**	$16812 \div 4$.	**15.**	$363636 \div 6$.
4.	$1224 \div 6$.	**10.**	$14721 \div 7$.	**16.**	$281435 \div 9$.
5.	$1612 \div 4$.	**11.**	$24816 \div 8$.	**17.**	$271836 \div 9$.
6.	$3240 \div 8$.	**12.**	$18924 \div 9$.	**18.**	$321632 \div 8$.

19. What is the difference between $\frac{1}{8}$ of 824 and 824 $\div$ 4?

20. Which would you rather have — $\frac{1}{4}$ of \$1200 or \$1200 $\div$ 3?

290. Are 5 tens and 6 ones equal to 4 tens and 16 ones?

Complete:

34 = 3 tens + 4 ones = 2 tens + —— ones.
78 = 7 tens + 8 ones = 6 tens + —— ones.
42 = 4 tens + 2 ones = 3 tens + —— ones.
87 = 8 tens + 7 ones = 6 tens + —— ones.
95 = 9 tens + 5 ones = 5 tens + —— ones.
126 = 12 tens + 6 ones = 7 tens + —— ones.

1. Divide 34 by 2, or find $\frac{1}{2}$ of 34.

2) 34 = 2 tens + 14 ones. — $\frac{1}{2}$ of 2 tens = 1 ten.
17 = 1 ten + 7 ones. — $\frac{1}{2}$ of 14 ones = 7 ones.

Complete:

2. $\frac{1}{2}$ of 78 =
3. $\frac{1}{3}$ of 42 =
4. $\frac{1}{3}$ of 87 =
5. $\frac{1}{5}$ of 95 =
6. $\frac{1}{7}$ of 126 =
7. $\frac{1}{4}$ of 52 =
8. $\frac{1}{5}$ of 65 =
9. $\frac{1}{4}$ of 64 =
10. 76 $\div$ 2 =
11. 51 $\div$ 3 =
12. 80 $\div$ 5 =
13. 78 $\div$ 6 =

291. 1. Divide 968 by 8.

8) 968 = $8h + 16t + 8o$
121 = $1h + 2t + 1o$

Divide:

2. 568 by 4.
3. 605 by 5.
4. 847 by 7.
5. 726 by 6.
6. 655 by 5.
7. 968 by 8.
8. 780 by 6.
9. 648 by 4.
10. 516 by 3.
11. 750 by 5.
12. 684 by 4.
13. 846 by 6.

292. 1. Divide 945 by 7.

$$7)\,945 = 7h + 24t + 5o = \frac{7h + 21t + 35o}{1h + 3t + 5o}$$

$9h \div 7 = 1h$, and $2h$ or $20t$ remaining; $24t \div 7 = 3t$, and $3t$ or $30o$ remaining; $35o \div 7 = 5o$.

Divide:

2	**3**	**4**	**5**	**6**	**7**
5) 625	4) 548	3) 525	6) 756	5) 725	4) 632
8	**9**	**10**	**11**	**12**	**13**
6) 852	3) 534	8) 984	7) 952	8) 992	6) 948
14	**15**	**16**	**17**	**18**	
4) 8524	3) 6471	2) 2756	5) 5620	6) 6804	
19	**20**	**21**	**22**	**23**	
4) 9256	3) 7260	2) 3674	5) 6705	6) 7344	

293. 1. Divide 7356 by 12.

(a)

12) 7356

613

73 hundreds ÷ 12 = 6 hundreds, and 1 hundred remaining.
15 tens ÷ 12 = 1 ten, and 3 tens remaining.
36 ones ÷ 12 = 3 ones.

(b)

12) 7356 (613 quotient.
72
15
12
36
36

A common way of proceeding is something like the following: 12 in 73 *6* times and 1 over; 12 in 15 *once* and 3 over; 12 in 36 *3* times.

The process as shown in (a) is called *short division;* as shown in (b) is *long division.* Wherein do they differ? In what ways are they alike?

2. Divide 864 by 24.

24) 864 (36
72
144
144

86 tens ÷ 24 = 3 tens and a remainder. 24 × 3 tens = 72 tens. 14 tens and 4 ones are 144 ones. 144 ones ÷ 24 = 6 ones. 24 × 6 ones = 144 ones.

Find the quotients:

3.	5670 ÷ 6.	**13.**	3454 ÷ 11.	**23.**	7072 ÷ 52.
4.	7212 ÷ 6.	**14.**	4565 ÷ 11.	**24.**	3536 ÷ 26.
5.	6315 ÷ 5.	**15.**	4851 ÷ 21.	**25.**	5346 ÷ 22.
6.	3507 ÷ 7.	**16.**	9702 ÷ 21.	**26.**	14624 ÷ 32.
7.	2536 ÷ 8.	**17.**	3844 ÷ 31.	**27.**	14616 ÷ 42.
8.	9208 ÷ 8.	**18.**	7688 ÷ 31.	**28.**	25599 ÷ 53.
9.	7452 ÷ 12.	**19.**	9963 ÷ 41.	**29.**	62350 ÷ 25.
10.	3744 ÷ 12.	**20.**	7488 ÷ 24.	**30.**	20020 ÷ 35.
11.	4956 ÷ 12.	**21.**	6908 ÷ 22.	**31.**	10368 ÷ 36.
12.	6276 ÷ 12.	**22.**	9050 ÷ 25.	**32.**	30576 ÷ 48.

294. **1.** Find one half of \$49.

2) \$49 = \$40 + \$9
\$24½ = \$20 + \$4½

½ of 4 tens, or \$40, = \$20.
½ of 9 ones, or \$9, = \$4½, or \$4.50.

When there is a remainder we may write the quotient and remainder as a complete quotient, as \$24½ above.

Find:

2.	½ of \$25.	**7.**	¼ of 45 gal.	**12.**	¼ of 127.
3.	⅓ of 10 yd.	**8.**	½ of 15 pk.	**13.**	⅓ of 214.
4.	½ of 45 qt.	**9.**	¼ of 69 bu.	**14.**	⅕ of 366.
5.	½ of 75 bu.	**10.**	$\frac{1}{10}$ of \$21.	**15.**	⅛ of 329.
6.	¼ of \$89.	**11.**	¼ of 145 lb.	**16.**	$\frac{1}{10}$ of 501.

295. 1. At 60¢ a gallon, what is the value of a quart of molasses?

2. How many times can you fill an 8-gallon jug from a barrel that holds 48 gallons?

3. A crate holds 1728 eggs. How many dozen eggs are there in the crate?

4. When you know the cost of 10 apples, how can you find the cost of one apple?

5. A cattle dealer paid $682 for 22 head of cattle. What was the average price?

6. How many years old is a man who has lived 900 months?

7. Tommy Jones weighs 100 lb. A ton of hay weighs as much as 20 such boys. How many pounds in a ton?

8. If there are 60,000 lb. of coal in a car, how many tons are in it?

9. A nine-acre field produced 375 bushels of oats. How many bushels to the acre did it yield?

10. In 4 years the President receives salary to the amount of $200,000. What is his yearly salary?

11. There are 5280 ft. in a mile. How many yards in a mile?

12. If a man saves $12 a month, in how many months will he save $1440? In how many years?

13. One day the fares on a certain street car amounted to 2450 cents. Each passenger paid 5 cents. How many persons rode on the car that day?

14. If a man on a bicycle rides 48 miles each day in June, how much farther will he have to travel to make 1500 miles?

15. Mr. Butler divided $19500 equally among his 3 children. The daughter divided her share equally among her 5 children. How much did each grandchild get?

REVIEW WORK.

Oral Exercises.

296. 1. If 6 oranges cost 30 cents, what will 3 oranges cost?

If 6 oranges cost 30 ct., 1 orange will cost $\frac{1}{6}$ of 30 ct., or 5 ct.; and 3 oranges will cost 3×5 ct., or 15 ct.

2. If 9 cords of wood cost \$36, what will 1 cord cost? What will 12 cords cost?

3. If 4 knives cost 96 cents, what will 9 knives cost?

4. If $\frac{1}{2}$ of a pound of candy costs 10 cents, how much must I pay for 2 pounds?

5. If $\frac{1}{3}$ of a pound of cheese costs 5 cents, how much will 2 pounds cost?

6. If 4 men can do a piece of work in 6 days, how many days will it take 3 men to do it?

If it takes 4 men 6 days to do the work, it will take 1 man 4×6 days, or 24 days; if it takes 1 man 24 days, it will take 3 men $\frac{1}{3}$ of 24 days, or 8 days.

7. If 8 men can mow a field in 9 days, how many days will it take 6 men to mow the field?

8. If 4 men can dig a ditch in 5 days, how many men will be required to dig it in 4 days?

9. 7 is $\frac{1}{4}$ of what number?

10. At 10 cents a dozen, what will 60 apples cost?

11. How many oranges at the rate of 2 for 5 cents can I buy for 20 cents?

12. How many coats can be cut from 21 yards of cloth, if 3 coats can be cut from 9 yards?

13. How many pounds of sugar at 6 cents a pound must be given for 2 pounds of coffee at 15 cents a pound?

14. If you divide 36 marbles among 6 boys, how many marbles will 2 boys have?

15. If a railroad car has 8 wheels, how many cars will 40 wheels supply?

16. A boy bought 6 lead pencils at 4¢ each and exchanged them for erasers at 3¢ each. How many erasers did he get?

17. If 7 men can do a piece of work in 9 days, how many men will it take to do the same work in 1 day?

18. If you buy 3 dozen pencils at 20¢ a dozen, and sell them at 3¢ each, how much do you gain?

19. John is 9 years old, and his father is 3 times as old and 9 years more. How old is his father?

20. If a man pays $30 for 6 sheep, how much at the same rate does he pay for 5 sheep?

21. How many square yards in the floor of a room 15 yards long and 9 yards wide?

22. Alice's father gave her $2 every 2 months. How many dollars did he give her in a year?

23. If a cow gives 6 qt. of milk a day, how many gallons does she give in six days?

24. $28 is $7 more than the cost of 3 tons of coal. What does 1 ton cost?

25. A man pays $3 a month for his room rent and $9 a month for his office rent. How much rent does he pay a year?

26. If 2 oranges are worth 4 apples, how many oranges are worth 12 apples?

Written Exercises.

297. **1.** A man gave $35 for a wagon, and paid $4 for repairing it. For how much must he sell it to gain $11?

2. There are CL Psalms. When you have read XC, how many more have you to read?

3. The earth moves in its orbit 19 miles a second. How many miles does it move a minute?

4. B and C start from the same place and travel in opposite directions. B travels 5 miles an hour, and C 4 miles an hour. How far apart are they in 15 hours?

5. A clock strikes 156 times a day. How often will it strike in a year of 365 days?

6. A barrel of flour weighs 196 pounds. What is the weight of $\frac{1}{2}$ a barrel?

7. Sound travels 1120 feet a second. How far off is a cannon, the report of which is heard in 13 seconds?

8. How many times will 500 oranges fill a fruit dish that holds 1 dozen oranges, and how many will be left over?

9. If you purchase a horse for \$100, and pay \$40 in cash, how long must you work at the rate of \$12 a week to pay the balance?

10. If your pulse beats 4320 times in an hour, how many times will it beat in a day?

11. In what number is 225 contained 25 times?

12. Gold was discovered in California in 1848. How many years ago was that?

13. A farmer sold 60 bushels of apples at \$2 a bushel. How many pigs can he buy at \$4 each with the money?

14. One farmer gets \$200 for his wood, and his neighbor gets \$248. The price is \$8 a cord. How many cords do they both sell?

15. A boy takes 9 subscriptions to the "Youth's Companion" at \$1.75 each. How much money does he receive for them all?

16. A building is 240 feet long and 200 feet wide. How many yards is it around the building?

17. A man owed \$5000. He made three payments, one of \$1375, another of \$964, and another of \$2484. How much did he still owe?

18. A car line is 12 miles long. If a car makes 6 round trips daily, how many miles will it run during the month of July?

19. If 8 cords of wood are worth $32, what are 19 cords worth?

20. America was discovered in 1492; the Pilgrims landed at Plymouth in 1620. How many years from the discovery of America to the landing of the Pilgrims?

21. A man paid $175 for a horse, which was 5 times as much as he paid for a cow. How much did he pay for both?

22. The multiplicand was 3962; the multiplier was 186. What was the product?

23. If the divisor is 55, and the dividend is 9625, what is the quotient?

24. The floor of a room 16 ft. long contains 192 square feet. What is the width?

25. How many marble slabs each 10 in. by 2 ft. will cover a floor 10 ft. square?

26. A baker has 200 loaves of bread. He sells $\frac{3}{4}$ of them at 6¢ each, and the remainder at 5¢ each. How much does he get for his bread?

27. If 3 oranges cost 10¢, how many times 10¢ must be paid for a dozen oranges?

28. A farmer clipped 1000 lb. of wool from his sheep. If each fleece weighed 5 lb., how many sheep had he?

29. A sugar plantation produces 2000 barrels of sugar, averaging 250 lb. in weight. At 2¢ a pound, what is the value of the sugar?

30. A man earns $2.50 a day and pays 50¢ a day for board. If he does not work on Sundays, how much will he have left this month after paying his board?

U. S. Money and Decimals.

Ten dimes make a dollar.

298. What part of a dollar is 1 dime? 2 dimes? 3 dimes? 5 dimes? 10 dimes?

How many *tenths* of a dollar make a dollar?

How many *tenths* make 1 *one?*

A dime is 1 tenth of a dollar. We write dimes (tenths of dollars) in the first place to the right of dollars.

Where with reference to ones' place should we write tenths of ones?

What do we place between the figures for dollars and the figures for dimes?

Should we place the *decimal point* after *ones* and before *tenths?*

Tenths occupy the first place to the right of the decimal point.

The number five and three-tenths is written 5.3.

The number .3, or 0.3, is read *three tenths.*

299. What part of a dollar is 1 cent? 2¢?

How many hundredths of a dollar are 3¢? 5¢? 10¢? 25¢? 50¢?

1¢ = \$.01 = $\frac{1}{100}$ of a dollar = .01 of a dollar.
2¢ = \$.02 = $\frac{2}{100}$ of a dollar = .02 of a dollar.
5¢ = \$.05 = $\frac{5}{100}$ of a dollar = .05 of a dollar.
10¢ = \$.10 = $\frac{10}{100}$ of a dollar = .10 (or .1) of a dollar.
20¢ = \$.20 = $\frac{20}{100}$ of a dollar = .20 (or .2) of a dollar.
25¢ = \$.25 = $\frac{25}{100}$ of a dollar = .25 of a dollar.

Which is easier to wrie, $\frac{1}{100}$ of a dollar or .01 of a dollar?

There are two ways of writing *hundredths* and *tenths*.

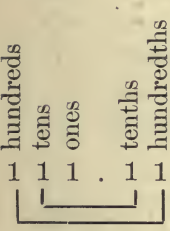
$\frac{1}{100}$ and .01 are both read *one-hundredth.*
$\frac{5}{100}$ and .05 are both read *five-hundredths.*
$\frac{1}{10}$ and .1 are both read *one-tenth.*
$\frac{5}{10}$ and .5 are both read *five-tenths.*
$\frac{2}{10}$ and .2 are both read *two-tenths.*
$\frac{25}{100}$ and .25 are both read *twenty-five-hundredths.*

300. How many *tenths* of a dollar are 10 cents (1 dime)?

How many *hundredths* of a dollar are 10 cents?

Then how many hundredths make 1 tenth?

10 hundredths make 1 tenth.
10 tenths make 1 one.



What is written between *tens* and *tenths?*

The places to the right of ones are called *decimal places.* Compare the names of the decimal places with those of the corresponding places on the left of the decimal point.

How many of each place make 1 of the next place to the left?

Does the figure next to the decimal point express tenths or hundredths? Which figure expresses hundredths?

When there are five hundredths and no tenths, what is written in tenths' place?

When there are tenths and no hundredths, is it necessary to put a zero in hundredths' place? Why not?

Is 1 tenth (.1) of a dollar equal to 10 hundredths of a dollar? Is 1 dime equal to 10 cents?

301. How many dimes and cents in:

\$.05	\$.04	\$.50	\$.25	\$.05
\$.20	\$.30	\$.08	\$.05	\$.75
\$.25	\$.34	\$.58	\$.30	\$.80

How many tenths and hundredths in:

.04	.4	.05	.7	.1	.45
.2	.03	.6	.05	.35	.12
.24	.43	.65	.75	.45	.57

302. Copy and complete:

4 hundredths of a dollar = 4¢ = \$.04.
6 hundredths of a dollar =
9 hundredths of a dollar =
3 tenths of a dollar =
7 tenths of a dollar =
2 tenths and 5 hundredths of a dollar =
25 hundredths of a dollar =
5 tenths and 8 hundredths of a dollar =

303. Write with the decimal point:

4 hundredths	4 tenths and 2 hundredths
7 hundredths	3 tenths and 6 hundredths
5 tenths	7 tenths and 5 hundredths
8 tenths	1 tenth and 0 hundredths
36 hundredths	10 hundredths
65 hundredths	50 hundredths

304. Two dimes and 5 cents are how many cents? Two tenths and 5 hundredths are how many hundredths?

Two dimes are how many cents? Two tenths are how many hundredths?

How many hundredths of a dollar make a dime? .10=.1.

A quarter is equal to how many hundredths of a dollar?

A silver dollar is worth how many hundredths of a dollar? How many tenths of a dollar? 10 tenths = —— hundredths.

How many tenths of a dollar make a half dollar? How many hundredths? .5 = .50.

75 cents = 7 dimes and —— cents.

75 hundredths = 7 tenths and —— hundredths.

Write with the decimal point:

$\frac{15}{100}$	$\frac{25}{100}$	$\frac{37}{100}$	$\frac{9}{10}$	$\frac{4}{100}$
$\frac{8}{100}$	$\frac{62}{100}$	$\frac{74}{100}$	$\frac{3}{10}$	$\frac{3}{100}$
$\frac{33}{100}$	$\frac{84}{100}$	$\frac{20}{100}$	$\frac{7}{10}$	$\frac{30}{100}$

305. What part of a dime is a cent?

One-tenth of a dime is what part of a dollar?

One-tenth of .1 of $1 is one —— of a dollar.

Compare $10 and $1. 10 ft. and 1 ft.

Six minutes is what part of an hour? 12 minutes?

How many tenths of an hour are thirty minutes?

What part of $500 is $50? $5?

What is .01 of $100? Of $200? Of $500?

One foot is what part of 100 feet? 10 feet?

A dollar, 3 dimes, and 2 nickels are how many tenths of a dollar?

Two dimes, a nickel, and 3 pennies are how many hundredths of a dollar?

How many *ones* in 30 tens? In 30 tenths?

How many ones and tenths are there in 25 tenths? Write it decimally.

How many ones, tenths, and hundredths in each of these: 1.11, 1.05, .05, .44, 55.55?

Draw a square and divide it into 10 equal parts. Point out .2 of the square. .5 of it. .7 of it.

Add:

(a)	(b)	(c)	(d)	(e)
37.5	26.8	62.4	81.92	25.65
25.6	34.2	13.7	34.34	43.37
47.5	51.3	45.6	56.87	68.98

Subtract:

(f)	(g)	(h)	(i)	(j)
62.55	48.75	72.44	49.8	85.3
12.42	25.30	36.23	37.5	62.9

Where do we place the decimal point in the result?

306. 1. At 5¢ each how many oranges can I buy for .5 of a dollar?

2. A farmer who had 100 sheep sold .1 of them to a butcher and .5 of them to a drover. How many did he sell?

3. Mr. Hall gave .3 of $50 to his daughter and .7 of $50 to his son. How much did each receive?

4. Clark spent $4, which was .1 of his money. How much money had he?

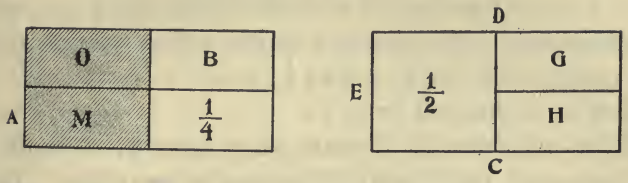
5. If $15 is .3 of my cash, what is .1 of it?

6. From 2.2 take .22. From 4 take .45.

7. Add 7.6, 7.8, 5.9, 3.4, and 5.7.

8. Bertha gave .2 of her money for a 10-cent doll. How much had she left?

COMMON FRACTIONS.



307. What part of A is dark? What part is light?

Into how many equal parts is A divided?

Is B one of the equal parts? What part of the rectangle is B?

How do we find $\frac{1}{4}$ of anything?

How does the line CD divide the rectangle E? What part of E is to the right of CD?

What part of this half is H? What part is G?

What part of the whole rectangle is H? Then may we find $\frac{1}{4}$ of a thing by dividing *half* of it into 2 equal parts?

One-fourth is what part of a half? How many fourths are equal to a half?

What is 2 times $\frac{1}{4}$? 3 times $\frac{1}{4}$? 4 times $\frac{1}{4}$?

How many times must I take $\frac{1}{4}$ to make $\frac{2}{4}$? $\frac{3}{4}$? $\frac{4}{4}$?

What part of E are G and H together?

One-half of A is how many times $\frac{1}{4}$ of it?

What part of A is B + O + M?

How many fourths of E is $\frac{1}{2}$ of it + $\frac{1}{4}$ of it?

O		H	E
D		A	F

308. This rectangle is divided into —— equal parts. Point out $\frac{1}{8}$ of it. $\frac{2}{8}$ of it. $\frac{4}{8}$ of it.

How many eighths of it are dark? How many are light?

How many fourths of it are dark? How many are light?

One-eight is what part of a fourth? How many eighths are equal to $\frac{1}{4}$? To $\frac{2}{4}$? To $\frac{3}{4}$?

How is $\frac{1}{8}$ obtained from $\frac{1}{4}$?

What is 2 times $\frac{1}{8}$? 3 times $\frac{1}{8}$? 4 times $\frac{1}{8}$? 6 times $\frac{1}{8}$?

How many eighths are there in the rectangle? How many have letters? How many have none? $\frac{8}{8} - \frac{6}{8} =$

How many fourths of the rectangle have letters? These 3 fourths are equal to how many eighths? $\frac{3}{4} = \frac{}{8}$?

What part of the whole rectangle is H + A + E + F? How many fourths? How many eighths? $\frac{2}{4} = \frac{}{8}$.

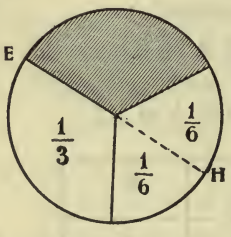
Show that $\frac{1}{2}$ of the rectangle $= \frac{2}{4}$ or $\frac{4}{8}$ of it.

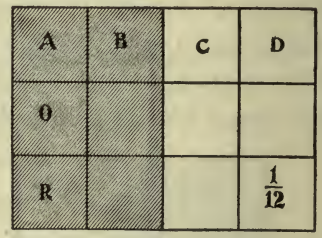
What part of the rectangle is O? What part is D? What part is O + D?

What is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{4}$ is equal to how many eighths? $\frac{3}{4}$? $\frac{5}{4}$?

How many eighths of the rectangle is $\frac{1}{4}$ of it + $\frac{1}{8}$ of it?

Six quarters are worth how many half dollars? $\frac{6}{4}$ are equal to how many halves?





309. What part of the circle is shaded? How many thirds of it are not shaded?

The dotted line divides one of the thirds into 2 equal parts. What is each part called?

One-sixth is what part of one-third? How many sixths are equal to $\frac{1}{3}$? To $\frac{2}{3}$? To $\frac{3}{5}$?

What part of the circle is below EH? Above EH?

Then which is larger, $\frac{1}{2}$ of the circle or $\frac{1}{3}$ of it? How much larger?

How many times must I take $\frac{1}{6}$ of the circle to make $\frac{4}{6}$ of it? To make the whole circle?

What part of the rectangle is A + B + C + D? Then C + D is what part?

What part of the rectangle is D? Then C + D = how many twelfths? $\frac{1}{2}$ of $\frac{2}{12}$ (or $\frac{1}{6}$) = $\frac{1}{12}$.

How many $\frac{1}{12}$'s are there in the rectangle? In $\frac{1}{2}$ of the rectangle? $\frac{1}{2} = \frac{\quad}{12}$.

What part of the rectangle is A + O + R?

Which is larger, $\frac{1}{4}$ of the rectangle or $\frac{1}{3}$ of it? Show how much larger.

How many $\frac{1}{12}$'s of the rectangle = $\frac{1}{3}$ of it + $\frac{1}{4}$ of it?

Find how many $\frac{1}{12}$'s of the rectangle are equal to $\frac{2}{3}$ of it. To $\frac{3}{4}$ of it.

Find how much larger $\frac{1}{4}$ of the rectangle is than $\frac{1}{6}$ of it.

310. Copy and complete:

$\frac{1}{2} = \frac{\quad}{4}$	$\frac{1}{2} = \frac{\quad}{6}$	$\frac{1}{4} = \frac{\quad}{12}$	$\frac{2}{4} = \frac{\quad}{8}$
$\frac{1}{3} = \frac{\quad}{6}$	$\frac{1}{2} = \frac{\quad}{8}$	$\frac{3}{4} = \frac{\quad}{12}$	$\frac{3}{4} = \frac{\quad}{8}$
$\frac{1}{4} = \frac{\quad}{8}$	$\frac{1}{2} = \frac{\quad}{12}$	$\frac{2}{4} = \frac{\quad}{12}$	$\frac{2}{3} = \frac{\quad}{6}$
$\frac{1}{6} = \frac{\quad}{12}$	$\frac{1}{3} = \frac{\quad}{12}$	$\frac{2}{6} = \frac{\quad}{12}$	$\frac{2}{3} = \frac{\quad}{12}$

311. What part of this rectangle is dark? How many fifths are light?

How many tenths of the rectangle make $\frac{1}{5}$ of it?

One-half of the dark portion is what part of the whole figure? $\frac{1}{2}$ of $\frac{1}{5}$ =

What part of the figure is on each side of AH?

Show how many tenths of the rectangle make $\frac{1}{2}$ of it.

What part of the figure is E+B+C?

If D were removed, what part of the whole would remain?

How many times C+D make up the figure? How many times $\frac{1}{5} = 1$?

How many fifths of a nickel make a dime (two nickels)? How many $\frac{1}{5}$'s in 2?

Point out $\frac{1}{5}$ of half the rectangle. It is what part of the whole? $\frac{1}{5}$ of $\frac{1}{2} =$

B+C+D+E = how many $\frac{1}{5}$'s of the figure? How many $\frac{1}{10}$'s? $\frac{2}{5} = \frac{}{10}$.

How many $\frac{1}{10}$'s make $\frac{3}{5}$? $\frac{4}{5}$? $\frac{5}{5}$? $\frac{7}{5}$?

How many $\frac{1}{10}$'s of the rectangle = $\frac{1}{5}$ of it + $\frac{1}{10}$ of it?

Which is larger, $\frac{2}{5}$ of the rectangle or $\frac{3}{10}$ of it? How much larger?

Draw a 10-inch square and divide it into square inches.

Each small square is what part of the whole?

How many *hundredths* in the upper row? Then how many hundredths make 1 tenth?

Find how many hundredths make $\frac{2}{10}$, or $\frac{1}{5}$. $\frac{5}{10}$, or $\frac{1}{2}$.

One-tenth is how many times as much as one-hundredth?

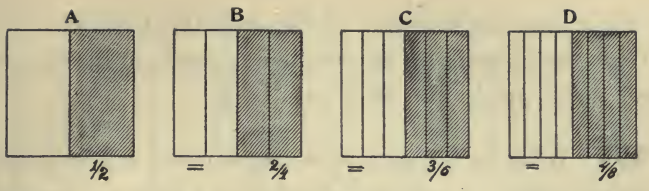
Find how many hundredths in $\frac{1}{4}$ of the large square. In $\frac{3}{4}$ of it.

One-hundredth is what part of 1 tenth?

Point out $\frac{1}{10}$ of one-tenth of the large square, and tell what it is called.

Complete: $\frac{1}{2} = \frac{}{4} = \frac{}{6} = \frac{}{8} = \frac{}{10} = \frac{}{12} = \frac{}{100}$

Complete: $1 = \frac{2}{2} = \frac{}{4} = \frac{}{6} = \frac{}{8} = \frac{}{10} = \frac{}{12} = \frac{}{100}$



312. A, B, C, and D are equal squares. What part of each is dark? Are the dark parts equal?

Into how many equal parts is B divided? How many of the dark parts are equal to the dark part of A? Then how do $\frac{1}{2}$ and $\frac{1}{4}$ compare in size?

How does $\frac{1}{2}$ of A compare in size with $\frac{3}{6}$ of C? Then what can you say of $\frac{1}{3}$ and $\frac{3}{6}$?

Compare $\frac{1}{2}$ of A with $\frac{4}{8}$ of D, and state what you learn.

Are 2 of the equal parts of B equal to 4 of the equal parts of D? Is $\frac{4}{8}$ greater than $\frac{2}{4}$? Is $\frac{3}{6}$?

Arrange the fractions $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, and $\frac{4}{8}$ in six groups of two fractions each. Compare each two, and tell what you learn.

In the fractions $\frac{1}{2}$ and $\frac{4}{8}$, what does the 2 show? The 1? The 8? The 4?

In the fraction $\frac{3}{6}$, which figure indicates the number of equal parts into which a whole is divided? What shows us how many of the parts are taken?

The number *below the line* of a fraction shows into how many equal parts anything is divided. It is called the **Denominator.**

The number *above* the line shows how many of the parts are taken. It is called the **Numerator.**

In $\frac{5}{8}$ of the rectangle, what does the 8 show? The 5?

Draw on the board a line 4 ft. long. Measure it with your foot rule, which is $\frac{1}{3}$ yd. in length. The line is how many thirds of a yard long?

What does the 3 show? What does the 4 show?

Give the meaning of the numerator and of the denominator in $\frac{3}{4}$. In $\frac{3}{8}$. in. In $\frac{5}{3}$ yd. In $\frac{1}{6}$.

313. What is the sum of a quarter and a half dollar?

The half-dollar = 2 quarters. 2 quarters + 1 quarter = 3 quarters.

What is the sum of $\frac{1}{2}$ bu. and a peck?

Add $\frac{1}{2}$ gal. and $\frac{1}{4}$ gal. $\frac{1}{2} + \frac{1}{4} = \frac{}{4}$.

Can you add halves and fourths without changing the halves to fourths?

Use your foot-rule to find the sum of $\frac{1}{4}$ in. and $\frac{1}{8}$ in. To find the sum of $\frac{1}{2}$ in. and $\frac{1}{8}$ in.

$\frac{1}{4} + \frac{1}{8} = \frac{}{8}$. $\frac{1}{2} + \frac{1}{8} = \frac{}{8}$.

What must be done with $\frac{1}{4}$ before it can be added to $\frac{1}{8}$? With $\frac{1}{2}$?

Only like numbers can be added. Fractions to be added must have the same denominator.

314. With a foot-rule complete:

$\frac{1}{2}$ in. + $\frac{1}{4}$ in. = $\frac{}{4}$ in. $\frac{1}{4}$ in. + $\frac{3}{8}$ in. = $\frac{}{8}$ in. $\frac{1}{8}$ in. + $\frac{2}{4}$ in. = $\frac{}{8}$ in.

$\frac{1}{4}$ in. + $\frac{1}{8}$ in. = $\frac{}{8}$ in. $\frac{5}{8}$ in. + $\frac{1}{4}$ in. = $\frac{}{8}$ in. $\frac{5}{8}$ in. + $\frac{1}{2}$ in. = $\frac{}{8}$ in.

$\frac{1}{8}$ in. + $\frac{1}{2}$ in. = $\frac{}{8}$ in. $\frac{1}{2}$ in. + $\frac{3}{8}$ in. = $\frac{}{8}$ in. $\frac{3}{4}$ in. + $\frac{1}{8}$ in. = $\frac{}{8}$ in.

When one fraction is to be subtracted from another, both must have the same denominator.

$\frac{1}{2}$ in. − $\frac{1}{4}$ in. = $\frac{}{4}$ in. $\frac{3}{8}$ in. − $\frac{1}{4}$ in. = $\frac{}{8}$ in. $\frac{3}{4}$ in. − $\frac{1}{2}$ in. = $\frac{}{4}$ in.

$\frac{1}{4}$ in. − $\frac{1}{8}$ in. = $\frac{}{8}$ in. $\frac{5}{8}$ in. − $\frac{1}{2}$ in. = $\frac{}{8}$ in. 1 in. − $\frac{3}{4}$ in. = $\frac{}{4}$ in.

$\frac{1}{2}$ in. − $\frac{1}{8}$ in. = $\frac{}{8}$ in. 1 in. − $\frac{3}{8}$ in. = $\frac{}{8}$ in. $\frac{3}{4}$ in. − $\frac{3}{8}$ in. = $\frac{}{8}$ in.

1 in. − $\frac{1}{4}$ in. = $\frac{}{4}$ in. $\frac{1}{2}$ in. − $\frac{3}{8}$ in. = $\frac{}{8}$ in. $\frac{7}{8}$ in. − $\frac{3}{4}$ in. = $\frac{}{8}$ in.

315. Find the value of:

$\frac{1}{8} + \frac{1}{8}$	$\frac{5}{8} + \frac{2}{8} + \frac{1}{8}$	$\frac{7}{8} - \frac{2}{8}$	$1 + \frac{1}{4} + \frac{1}{8}$
$\frac{3}{8} + \frac{1}{8}$	$\frac{1}{2} + \frac{1}{4} + \frac{1}{2}$	$1 - \frac{3}{4}$	$\frac{1}{2} + \frac{1}{4} + \frac{3}{8}$
$\frac{1}{4} + \frac{3}{8}$	$\frac{3}{4} + \frac{1}{2} + \frac{1}{4}$	$\frac{3}{8} - \frac{1}{4}$	$\frac{3}{4} + \frac{2}{4} - \frac{1}{2}$
$\frac{3}{4} + \frac{1}{8}$	$\frac{5}{8} + \frac{1}{4} + \frac{3}{8}$	$\frac{1}{2} - \frac{1}{8}$	$\frac{5}{8} + \frac{4}{8} - \frac{1}{4}$
$\frac{2}{4} + \frac{2}{8}$	$\frac{1}{8} + \frac{1}{2} + \frac{4}{8}$	$\frac{3}{4} - \frac{1}{2}$	$\frac{1}{2} + \frac{1}{4} - \frac{1}{8}$
$\frac{3}{8} + \frac{1}{2}$	$\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$	$\frac{3}{4} - \frac{3}{8}$	$\frac{3}{4} + \frac{3}{8} - \frac{1}{2}$

316. Copy and complete:

2 times $\frac{1}{4} = \frac{2}{4}$ or $\frac{1}{2}$.
2 times $\frac{2}{4} =$ ___ or ___.
2 times $\frac{1}{8} =$ ___ or ___.
2 times $\frac{2}{8} =$ ___ or ___.
4 times $\frac{1}{4} =$ ___ or

$3 \times \frac{2}{8} =$ ___ or ___.
$2 \times \frac{3}{8} =$ ___ or ___.
$4 \times \frac{2}{8} =$ ___ or ___.
$8 \times \frac{1}{8} =$ ___ or
$8 \times \frac{1}{4} =$ ___ or

317. How many $\frac{1}{4}$'s $= \frac{1}{2}$? How many $\frac{1}{8}$'s $= \frac{1}{2}$?
$\frac{2}{4}$ = how many times $\frac{1}{4}$? $\frac{4}{8}$ = how many times $\frac{1}{8}$?
How many times is 1 ft. contained in 3 ft?

3 ft. ÷ 1 ft. = ——. 3 fourths ÷ 1 fourth = ——.
6 yd. ÷ 2 yd. = —— times. $\frac{6}{4} \div \frac{2}{4} =$ —— times.
$\frac{1}{2}$ of 2 qt. = —— qt. $\frac{1}{2}$ of $\frac{2}{4} =$ ___.
$\frac{1}{3}$ of 3 ft. = —— ft. $\frac{1}{3}$ of $\frac{3}{8} =$ ___.

$\frac{1}{4}$ is contained in $\frac{1}{2}$ —— times.
$\frac{1}{8}$ is contained in $\frac{1}{4}$ —— times.
$\frac{1}{8}$ is contained in $\frac{1}{2}$ how many times?
$\frac{1}{8}$ is contained in $\frac{3}{4}$ how many times?
$\frac{2}{8}$ is contained in $\frac{1}{2}$ how many times?
$\frac{3}{8}$ is contained in $\frac{3}{4}$ how many times?
$\frac{1}{4}$ is contained in 1 how many times?
$\frac{1}{4}$ is contained in 2 how many times?

How many $\frac{1}{4}$'s are there in 1? In 2? In 5?
How many $\frac{1}{2}$'s are there in 2? In 5? In 12?
How many $\frac{1}{8}$'s are there in 1? In 2? In 3?
How many eighths of an inch in 4 inches? In 12 inches?

318. Complete and read:

1 in. + $\frac{1}{2}$ in. = $1\frac{1}{2}$ in. (one and one-half inches), or $\frac{3}{2}$ in.

2 in. + $\frac{1}{4}$ in. =
1 in. + $\frac{1}{8}$ in. =
5 in. + $\frac{3}{4}$ in. =
3 in. + $\frac{5}{8}$ in. =
1 hr. + $\frac{3}{4}$ hr. =
4 gal. + $\frac{1}{2}$ gal. =

319. In $1\frac{1}{4}$ gal. how many fourths? How many quarts?
In $2\frac{1}{2}$ bu. how many halves? How many pecks?
In $1\frac{1}{8}$ in. how many eighths? In $2\frac{1}{8}$ inches?
In $\$3\frac{3}{4}$ how many fourths, or quarters?
In $2\frac{1}{2}$ yd. how many halves? How many fourths?

Change to fourths:

$\frac{1}{2}$	$2\frac{1}{2}$	$4\frac{1}{2}$	$\frac{6}{8}$	$1\frac{3}{4}$	$\frac{10}{2}$
$1\frac{1}{4}$	$3\frac{1}{4}$	$\frac{3}{2}$	$\frac{4}{8}$	$5\frac{1}{2}$	$\frac{12}{2}$

Six half-inches = how many inches?
Twelve quarter-inches = how many inches?
Three half inches = how many inches and half-inches?
How many inches in $\frac{4}{2}$ in.? In $\frac{8}{4}$ in.? In $\frac{16}{8}$ in.?
How many inches and half-inches in $\frac{5}{2}$ in.? In $\frac{7}{2}$ in.?

320. 1. If a horse eats three times a day, and eats $\frac{1}{2}$ pk. of oats at a time, how many half-pecks will he eat in 6 days? How many pecks? How many bushels?

2. When milk is 3¢ a pint, how much must be paid for $1\frac{1}{2}$ quarts?

3. If $\frac{1}{2}$ of a yard of cloth costs 24¢, what does $\frac{1}{4}$ of a yard cost?

4. How many sheets of paper at $\frac{1}{2}$¢ apiece can you buy for 5¢?

5. If $\frac{3}{4}$ of a yard of ribbon costs 18¢, what is the cost of $\frac{1}{4}$ of a yard? Of $\frac{1}{2}$ of a yard?

6. Tom earned $\frac{1}{2}$ of a dollar on Monday and $\frac{3}{4}$ of a dollar on Tuesday. How much did he earn?

7. A box is $\frac{6}{8}$ yd. long and $\frac{1}{2}$ yd. wide. By how much does the length exceed the width?

8. Each side of a square is $\frac{3}{4}$ ft. long. What is the perimeter?

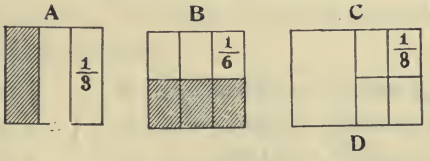
9. A lady who had $\frac{7}{8}$ of a gallon of milk sold a quart to a neighbor. What part of a gallon had she left?

10. A man who had $40 spent $10. What part of his money had he left?

11. Tillie had $\frac{3}{8}$ of a yard of velvet and gave Nell $\frac{1}{3}$ of it. What part of a yard had Tillie left?

12. Draw a rectangle 12 in. long and $\frac{1}{4}$ as wide. How many square inches in $\frac{1}{4}$ of it? In $\frac{3}{4}$ of it?

Common Denominator.



321. How many $\frac{1}{6}$'s are equal to $\frac{1}{3}$? Then $\frac{1}{3}$ is how many times $\frac{1}{6}$?

Multiply numerator and denominator of $\frac{1}{3}$ by 2. What is the result?

When $\frac{1}{3}$ is changed to $\frac{2}{6}$, how is the size of the parts changed? Are more of them taken?

By what must numerator and denominator of $\frac{1}{2}$ be multiplied to change it to $\frac{4}{8}$?

The part on the left of CD is how many times as large as one of the parts on the right?

The number of parts on the right of CD is —— times the number of parts on the left.

Multiply numerator and denominator of $\frac{1}{2}$ by 3, and explain the result.

Divide numerator and denominator of $\frac{4}{8}$ by 4. Is the result equal to $\frac{4}{8}$?

By what must you divide numerator and denominator of $\frac{5}{10}$ to change it to $\frac{1}{2}$?

Show that the following is true:

If both numerator and denominator of a fraction are multiplied, or divided, by the same number, the value of the fraction is not changed.

322. Change $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ to 12ths.

Both numerator and denominator of $\frac{1}{2}$ must be multiplied by $12 \div 2$, or 6.

Both numerator and denominator of $\frac{2}{3}$ must be multiplied by $12 \div 3$, or 4.

By what must both numerator and denominator of $\frac{3}{4}$ be multiplied?

Change:

1. $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ to 12ths.
2. $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{8}$ to 8ths.
3. $\frac{1}{2}$, $\frac{2}{5}$, and $\frac{3}{10}$ to 10ths.
4. $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{5}{6}$ to 12ths.
5. $\frac{1}{2}$, $\frac{3}{4}$, $\frac{4}{5}$, and $\frac{7}{10}$ to 20ths.
6. $\frac{1}{4}$, $\frac{3}{5}$, $\frac{5}{8}$, and $\frac{1}{10}$ to 40ths.
7. $\frac{3}{4}$, $\frac{1}{2}$, $\frac{2}{5}$, and $\frac{3}{10}$ to 100ths.
8. $\frac{6}{8}$, $\frac{3}{12}$, $\frac{12}{16}$, and $\frac{15}{20}$ to 4ths.

323. Change to smaller denominators:

9. $\frac{3}{6}$, $\frac{4}{8}$, $\frac{5}{10}$, $\frac{4}{12}$ **12.** $\frac{6}{12}$, $\frac{15}{20}$, $\frac{12}{18}$, $\frac{10}{20}$

10. $\frac{4}{6}$, $\frac{6}{8}$, $\frac{6}{10}$, $\frac{8}{12}$ **13.** $\frac{10}{25}$, $\frac{20}{30}$, $\frac{40}{50}$, $\frac{30}{100}$

11. $\frac{2}{4}$, $\frac{8}{10}$, $\frac{10}{12}$, $\frac{12}{16}$ **14.** $\frac{25}{100}$, $\frac{10}{100}$, $\frac{50}{100}$, $\frac{75}{100}$

15. In $\frac{6}{12}$ of a dozen how many half dozen?

16. In $\frac{3}{4}$ of a dozen how many $\frac{1}{12}$'s of a dozen?

17. In $\frac{1}{3}$ of a dozen how many $\frac{1}{12}$'s of a dozen?

18. How many more oranges are $\frac{1}{3}$ of a dozen than $\frac{1}{4}$ of a dozen? What part of a dozen more?

19. How many 12ths of a foot (inches) in $\frac{1}{2}$ foot? In $\frac{2}{3}$ foot?

20. In $1\frac{1}{3}$ yards how many thirds? How many feet?

21. How many yards in $\frac{6}{3}$ yd.? How many feet?

22. How many ones are equal to $\frac{9}{3}$? $\frac{12}{6}$? $\frac{24}{12}$?

23. How many ones and thirds in $\frac{5}{3}$? In $\frac{7}{3}$? $\frac{10}{3}$?

24. In $\frac{5}{2}$ how many fourths? In $\frac{8}{4}$ how many halves?

25. Change $1\frac{1}{4}$ bu. and $\frac{1}{2}$ bu. to pecks, or fourths (of a bushel).

Addition and Subtraction.

324. Fractions that have a common denominator are called **Similar** fractions. Only similar fractions can be added or subtracted. Change to similar fractions and add or subtract as indicated:

1. $\frac{1}{3}+\frac{1}{6}=\frac{}{6}$ **9.** $\frac{3}{6}+\frac{1}{12}=\frac{}{12}$ **17.** $\frac{1}{3}-\frac{1}{6}=\frac{}{6}$

2. $\frac{2}{3}+\frac{1}{6}=\frac{}{6}$ **10.** $\frac{1}{2}+\frac{1}{12}=\frac{}{12}$ **18.** $\frac{2}{3}-\frac{1}{6}=\frac{}{6}$

3. $\frac{1}{3}+\frac{2}{6}=\frac{}{6}$ **11.** $\frac{1}{3}+\frac{1}{12}=\frac{}{12}$ **19.** $\frac{1}{2}-\frac{1}{3}=\frac{}{6}$

4. $\frac{1}{2}+\frac{1}{6}=\frac{}{6}$ **12.** $\frac{2}{3}+\frac{1}{12}=\frac{}{12}$ **20.** $\frac{1}{6}-\frac{1}{12}=\frac{}{12}$

5. $\frac{1}{2}+\frac{2}{6}=\frac{}{6}$ **13.** $\frac{2}{3}+\frac{3}{12}=\frac{}{12}$ **21.** $\frac{2}{6}-\frac{1}{12}=\frac{}{12}$

6. $\frac{1}{2}+\frac{1}{3}=\frac{}{6}$ **14.** $\frac{1}{2}+\frac{5}{12}=\frac{}{12}$ **22.** $\frac{3}{6}-\frac{1}{12}=\frac{}{12}$

7. $\frac{1}{6}+\frac{1}{12}=\frac{}{12}$ **15.** $\frac{1}{2}+\frac{3}{6}=\frac{}{12}$ **23.** $\frac{7}{12}-\frac{1}{2}=\frac{}{12}$

8. $\frac{2}{6}+\frac{1}{12}=\frac{}{12}$ **16.** $\frac{1}{4}+\frac{1}{12}=\frac{}{12}$ **24.** $\frac{1}{4}-\frac{1}{12}=\frac{}{12}$

Find the value of:

25. $\frac{1}{2} + \frac{1}{5}$
26. $\frac{1}{5} + \frac{1}{10}$
27. $\frac{3}{5} + \frac{1}{2}$
28. $\frac{3}{10} + \frac{4}{5}$
29. $\frac{1}{2} + \frac{2}{3}$
30. $\frac{1}{2} + \frac{1}{5} + \frac{1}{10}$
31. $\frac{3}{4} + \frac{2}{3} + \frac{1}{6}$
32. $\frac{3}{2} + \frac{2}{5} + \frac{1}{4}$
33. $\frac{1}{2} + \frac{1}{3} + \frac{3}{4}$
34. $\frac{3}{10} + \frac{1}{4} + \frac{25}{100}$
35. $\frac{2}{5} - \frac{1}{10}$
36. $\frac{7}{10} - \frac{2}{5}$
37. $\frac{1}{2} - \frac{1}{5}$
38. $\frac{1}{2} - \frac{1}{3}$
39. $\frac{75}{100} - \frac{5}{10}$

In the following exercises add the integers and fractions separately, and then add the results:

40. $3\frac{2}{3} + 7\frac{3}{4}$
41. $2\frac{1}{2} + 5\frac{7}{8}$
42. $6\frac{3}{5} + 3\frac{1}{2}$
43. $1\frac{2}{3} + 4\frac{5}{6}$
44. $8\frac{3}{10} + 5\frac{4}{5}$
45. $6\frac{1}{2} + 2\frac{3}{8} + 1\frac{1}{4}$
46. $9\frac{2}{3} + 3\frac{5}{6} + 4\frac{7}{12}$
47. $8\frac{1}{4} + 7\frac{3}{10} + 12\frac{25}{100}$
48. $2\frac{3}{5} + 5\frac{7}{10} + 24\frac{3}{20}$
49. $10\frac{1}{5} + 9\frac{3}{4} + 26\frac{75}{100}$

50. Subtract $2\frac{3}{4}$ from $5\frac{1}{2}$.

$$5\tfrac{1}{2} = 5\tfrac{2}{4} = 4\tfrac{6}{4}$$
$$2\tfrac{3}{4} = 2\tfrac{3}{4} = 2\tfrac{3}{4}$$
$$2\tfrac{3}{4} \qquad\qquad 2\tfrac{3}{4}$$

The fractions are first made similar. We cannot take $\frac{3}{4}$ from $\frac{2}{4}$, so we take 1 one, or $\frac{4}{4}$, from the 5 ones, and add it to the $\frac{2}{4}$. We then take $\frac{3}{4}$ from $\frac{6}{4}$, and 2 from 4.

Subtract:

51. $7\frac{1}{4}$ from $10\frac{1}{2}$
52. $3\frac{2}{3}$ from $6\frac{1}{2}$
53. $5\frac{3}{4}$ from $9\frac{1}{3}$
54. $2\frac{1}{2}$ from $7\frac{3}{8}$
55. $4\frac{3}{5}$ from $8\frac{8}{10}$
56. $12\frac{1}{2}$ from $16\frac{1}{4}$
57. $22\frac{1}{3}$ from $30\frac{8}{6}$
58. $31\frac{5}{5}$ from $42\frac{1}{4}$
59. $16\frac{7}{10}$ from $20\frac{3}{5}$
60. $37\frac{50}{100}$ from $62\frac{3}{10}$

Multiplication and Division.

325. Complete:

3 times $\frac{1}{6} = \frac{}{6}$ or $\frac{}{2}$

2 times $\frac{1}{6} = \frac{}{6}$ or $\frac{}{3}$

2 times $\frac{2}{6} = \frac{}{6}$ or $\frac{}{3}$

3 times $\frac{2}{6} = \frac{}{6}$ or

3 times $\frac{1}{3} = \frac{}{3}$ or

4 times $\frac{3}{6} = \frac{}{6}$ or

6 times $\frac{1}{3} = \frac{}{3}$ or

$2 \times \frac{1}{12} = \frac{}{12}$ or $\frac{}{6}$

$3 \times \frac{1}{12} = \frac{}{12}$ or $\frac{}{4}$

$4 \times \frac{1}{12} = \frac{}{12}$ or $\frac{}{3}$

$6 \times \frac{1}{12} = \frac{}{12}$ or $\frac{}{2}$

$8 \times \frac{1}{12} = \frac{}{12}$ or $\frac{}{3}$

$9 \times \frac{2}{12} = \frac{}{12}$ or $\frac{}{4}$

$6 \times \frac{2}{12} = \frac{}{12}$ or

326. How many $\frac{1}{6}$'s $= \frac{1}{3}$? How many $\frac{1}{12}$'s $= \frac{1}{6}$?

$\frac{3}{6}$ = how many times $\frac{1}{6}$? $\frac{1}{2}$ = how many $\frac{1}{6}$'s? $\frac{1}{12}$'s?

How many times is $\frac{1}{6}$ contained in $\frac{3}{6}$, or $\frac{1}{2}$?

3 sixths $\div$ 1 sixth = —— times. $\frac{3}{6} \div \frac{1}{6} =$ —— times.

$\frac{1}{6}$ is contained in $\frac{1}{3}$ —— times. $\frac{1}{3} \div \frac{1}{6} =$

$\frac{1}{6}$ is contained in 1 —— times. $1 \div \frac{1}{6} =$

$\frac{1}{12}$ is contained in $\frac{1}{6}$ —— times. $\frac{1}{6} \div \frac{1}{12} =$

$\frac{1}{12}$ is contained in $\frac{1}{2}$ —— times. $\frac{1}{2} \div \frac{1}{12} =$

$\frac{1}{2}$ of 2 sixths $= \frac{}{6}$. $\frac{1}{2}$ of $\frac{2}{6} = \frac{}{6}$.

$\frac{1}{2}$ of $\frac{4}{6} = \frac{}{6}$. $\frac{1}{2}$ of $\frac{4}{12} = \frac{}{12}$ or $\frac{}{6}$.

$\frac{1}{3}$ of $\frac{3}{6} = \frac{}{6}$. $\frac{1}{3}$ of $\frac{6}{12} = \frac{}{12}$ or $\frac{}{6}$.

How many $\frac{1}{3}$'s are there in 1? In 2? In 4?

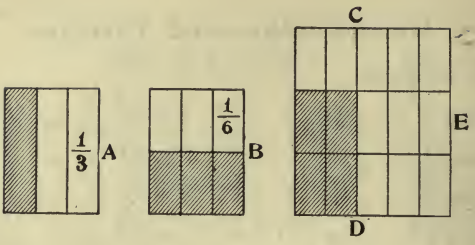
How many $\frac{1}{6}$'s are there in 1? In 2? In 5?

How many $\frac{1}{12}$'s are there in 1? In 2? In 3?

How many $\frac{1}{12}$'s of a foot in 2 inches? In 6 inches?

Four inches is what part of a foot?

How many inches $= \frac{2}{3}$ of a foot? $\frac{3}{4}$ of a foot?



327. If each third of A is divided into 2 equal parts, as in B, how many parts will there be?

What is each part of B called? $\frac{1}{2}$ of $\frac{1}{3} = \frac{\quad}{6}$.

How many *fifths* of E are there to the left of CD?

How many *thirds* of this part of E are dark?

How many *fifteenths* of E are dark?

Then $\frac{2}{3}$ of $\frac{2}{5} = \frac{\quad}{15}$. $\frac{2}{3} \times \frac{2}{5} = \frac{\quad}{\quad}$.

In finding $\frac{2}{3}$ of $\frac{2}{5}$ how was the 15 obtained? How was the numerator obtained?

To multiply one fraction by another—

We take the product of the numerators for the required numerator, and of the denominators for the denominator.

Find the product of:

1. $\frac{2}{3} \times \frac{3}{4}$
2. $\frac{1}{2} \times \frac{4}{5}$
3. $\frac{3}{4} \times \frac{1}{2}$
4. $\frac{5}{8} \times \frac{2}{3}$
5. $\frac{1}{2} \times \frac{5}{6}$
6. $\frac{2}{3} \times \frac{1}{2}$
7. $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4}$
8. $\frac{1}{3} \times \frac{2}{5} \times \frac{3}{4}$
9. $\frac{3}{5} \times \frac{1}{2} \times \frac{2}{3}$
10. $\frac{5}{8} \times \frac{2}{3} \times \frac{1}{2}$
11. $\frac{5}{6} \times \frac{1}{2} \times \frac{3}{4}$
12. $\frac{1}{2} \times \frac{3}{5} \times \frac{7}{10}$
13. $\frac{4}{5} \times \frac{9}{10}$
14. $\frac{5}{6} \times \frac{3}{5}$
15. $\frac{2}{3} \times \frac{7}{8}$
16. $\frac{1}{2} \times \frac{3}{10}$
17. $\frac{3}{4} \times \frac{10}{25}$
18. $\frac{7}{10} \times \frac{4}{5}$

19. Multiply $3\frac{1}{2}$ by 6.

$$\begin{array}{r} 3\frac{1}{2} \\ 6 \\ \hline 18 \quad = 6 \times 3 \\ 3 \quad = 6 \times \frac{1}{2} \\ \hline 21 \quad = 6 \times 3\frac{1}{2} \end{array}$$

We multiply the integral part, then the fractional, and add the results.

Find the products:

20.	$6 \times 4\frac{1}{2}$	**25.**	$7 \times 6\frac{2}{3}$	**30.**	$4 \times 12\frac{1}{2}$
21.	$9 \times 2\frac{1}{3}$	**26.**	$4 \times 5\frac{5}{8}$	**31.**	$6 \times 37\frac{1}{2}$
22.	$5 \times 7\frac{3}{4}$	**27.**	$8 \times 3\frac{5}{6}$	**32.**	$6 \times 16\frac{2}{3}$
23.	$4 \times 3\frac{3}{5}$	**28.**	$6 \times 4\frac{4}{5}$	**33.**	$3 \times 33\frac{1}{3}$
24.	$3 \times 9\frac{3}{8}$	**29.**	$9 \times 7\frac{2}{6}$	**34.**	$8 \times 62\frac{1}{2}$

328. 1. Divide 4 ft. by 2 ft. 4 thirds by 2 thirds.

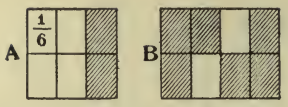
2. Find $\frac{1}{2}$ of 4 thirds. $\frac{4}{3} \div 2 = \frac{2}{3}$.

3. How many $\frac{2}{3}$'s in $\frac{8}{3}$? $\frac{8}{3} \div \frac{2}{3} =$ —— times.

Find the quotients:

4.	$\frac{4}{5} \div 2$	**9.**	$\frac{2}{5} \div \frac{1}{5}$	**14.**	$\frac{1}{5} \div \frac{1}{10}$
5.	$\frac{6}{8} \div 3$	**10.**	$\frac{6}{8} \div \frac{2}{8}$	**15.**	$\frac{1}{2} \div \frac{1}{10}$
6.	$\frac{5}{10} \div 5$	**11.**	$\frac{8}{3} \div \frac{4}{3}$	**16.**	$\frac{4}{5} \div \frac{2}{10}$
7.	$\frac{1}{3} \div 4$	**12.**	$\frac{9}{4} \div \frac{3}{4}$	**17.**	$\frac{1}{2} \div \frac{1}{4}$
8.	$\frac{8}{12} \div 2$	**13.**	$\frac{8}{6} \div \frac{4}{6}$	**18.**	$\frac{2}{3} \div \frac{2}{6}$

19. Write these fractions in a line, placing the largest first, the next largest second, and so on: $\frac{1}{5}$, $\frac{1}{2}$, $\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{10}$, $\frac{1}{4}$, $\frac{1}{12}$, $\frac{1}{6}$, $\frac{2}{8}$, $\frac{3}{4}$, $\frac{1}{100}$.



329. How many sixths of A are shaded? How many times is $\frac{2}{6}$ contained in A? Can you find out by inverting $\frac{2}{6}$?

Find how many times A contains $\frac{4}{6}$ (the light part).

What does A contain 6 times? What does it contain $\frac{6}{3}$, or 2 times?

B contains $\frac{4}{8}$ how many times? Can you tell by inverting $\frac{4}{8}$?

Invert $\frac{2}{8}$ and show how many times it is contained in the whole of B.

In B, $\frac{3}{8}$ is contained $2\frac{2}{3}$ times, or $\frac{8}{3}$ times.

Can we find how many times a fraction is contained in a whole or 1 by inverting the fraction?

Find how many times 1 contains $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{8}$, $\frac{2}{4}$, $\frac{5}{10}$, $\frac{2}{5}$.

One-half is contained in *one* 2 times; in four it is contained —— times.

How many times is $\frac{1}{4}$ contained in 1? In 2? In 5? In $\frac{1}{2}$?

To divide by a fraction—

Multiply the inverted divisor by the dividend.

330. 1. Divide 4 by $\frac{2}{3}$.

$\frac{3}{2}$ = the number of $\frac{2}{3}$'s in 1.

$4 \times \frac{3}{2} = \frac{12}{2}$, or 6, the number of $\frac{2}{3}$'s in 4.

Divide:

2.	5 by $\frac{1}{2}$	**8.**	6 by $\frac{2}{3}$	**14.**	10 by $\frac{2}{3}$
3.	3 by $\frac{1}{4}$	**9.**	2 by $\frac{3}{4}$	**15.**	3 by $\frac{1}{6}$
4.	6 by $\frac{1}{5}$	**10.**	5 by $\frac{2}{4}$	**16.**	2 by $\frac{5}{6}$
5.	4 by $\frac{1}{8}$	**11.**	8 by $\frac{2}{5}$	**17.**	5 by $\frac{3}{10}$
6.	7 by $\frac{1}{3}$	**12.**	3 by $\frac{4}{8}$	**18.**	4 by $\frac{5}{8}$
7.	5 by $\frac{1}{10}$	**13.**	4 by $\frac{5}{10}$	**19.**	2 by $\frac{9}{10}$

20. Divide $\frac{3}{4}$ by $\frac{2}{3}$.

Inverted divisor $\frac{3}{2}$ = the number of $\frac{2}{3}$'s in 1.
$\frac{3}{4} \times \frac{3}{2} = \frac{9}{8}$, or $1\frac{1}{8}$, the number of $\frac{2}{3}$'s in $\frac{3}{4}$.

Find the quotients:

21. $\frac{3}{4} \div \frac{1}{2}$	**25.** $\frac{1}{2} \div \frac{1}{10}$	**29.** $\frac{5}{8} \div \frac{1}{2}$
22. $\frac{1}{2} \div \frac{1}{3}$	**26.** $\frac{2}{3} \div \frac{1}{4}$	**30.** $\frac{5}{6} \div \frac{2}{3}$
23. $\frac{1}{2} \div \frac{1}{4}$	**27.** $\frac{3}{4} \div \frac{1}{3}$	**31.** $\frac{3}{4} \div \frac{3}{5}$
24. $\frac{1}{2} \div \frac{1}{8}$	**28.** $\frac{4}{5} \div \frac{2}{3}$	**32.** $\frac{4}{5} \div \frac{6}{10}$

331. **1.** Ella picked $\frac{1}{2}$ gal. berries and Nora picked $\frac{3}{4}$ gal. They both picked —— gal.

2. What is the difference between $\frac{1}{3}$ of an hour and $\frac{1}{5}$ of an hour?

3. How much will $3\frac{1}{2}$ quarts of milk cost, if 1 pint is worth 3 cents?

4. If carpet is $\frac{2}{3}$ yd. wide, how wide a room will 6 widths cover?

5. If $\frac{1}{4}$ of a yard of ribbon costs $2¢$, how many yards can you buy for 32 cents?

6. If I had $\frac{7}{8}$ of a yard of ribbon, and used $\frac{1}{2}$ of a yard, what part of a yard have I left?

7. At $\frac{1}{10}$ of a dollar a peck, how many pecks of apples can be bought for $\$\frac{2}{5}$? For $\$1$?

8. If a boy earns $\$\frac{3}{4}$ a day, in 12 days he will earn $\$$——.

9. How many 12's of a foot are equal to a yard?

10. At $\frac{1}{4}$ of a dollar a pound, how many pounds of coffee can I buy for $\$1$? For $\$5$?

11. James sold 2 bushels of apples at $10¢$ a half-peck. How much did he get for them?

12. 4 horses are $\frac{1}{3}$ of —— horses. (Show by dots.)

13. One-third of 12 sheep is —— sheep. $\frac{2}{3}$ of 12 sheep are —— sheep.

14. 8 quarts are $\frac{2}{3}$ of how many quarts? (Show by dots or squares.)

15. Bell bought a book for 10¢, which was $\frac{1}{4}$ of her money. How much had she?

16. There are 36 gallons of cider in a barrel which is $\frac{3}{4}$ full. How many gallons will the barrel hold?

17. A 3-gallon pail was full of water, but 2 quarts were taken out. What part of the water was taken out? What part was left?

18. If $\frac{3}{4}$ of a yard of cloth cost 15¢, what is the cost of $\frac{1}{4}$ of a yard? Of 1 yard? Of 2 yards?

19. If $\frac{3}{10}$ of the cost of a wagon was $12, what was the entire cost?

20. If $\frac{1}{2}$ bu. of corn is worth 20¢, what is the value of 2 bushels? Of $2\frac{1}{2}$ bu.?

21. Adam's house is $\frac{5}{8}$ of a mile south of the schoolhouse, and Dick's is $\frac{3}{8}$ of a mile north. How far apart do the boys live?

22. In a school of 48 scholars $\frac{5}{8}$ are girls. How many boys are there?

23. If $\frac{1}{2}$ lb. of coffee costs $.15, what will 2 pounds cost?

24. How many pieces of velvet, each half a yard long, can be cut from a piece $9\frac{1}{2}$ yards long?

25. I have a jointed fishing rod in 3 parts. One part is $2\frac{1}{2}$ feet long, another $2\frac{3}{4}$ feet, and the other $3\frac{3}{4}$ feet. How long is the rod?

26. $\frac{2}{3}$ of the days in April are how many days?

27. From a piece of ribbon $\frac{3}{4}$ ft. long a piece $\frac{3}{12}$ ft. long was cut off. Show the length of the remainder.

28. A rectangle is $\frac{1}{3}$ ft. long and $\frac{1}{8}$ ft. wide. What is the perimeter? How many square inches does it contain?

29. A box is $1\frac{1}{4}$ ft. long and $\frac{2}{3}$ ft. wide. Find how many square inches in the lid.

30. A lady bought $3\frac{1}{3}$ yd. of ribbon, and divided it equally among 5 girls. What part of a yard did each girl get? ($3\frac{1}{3}$ yd. $\div$ 5 = $\frac{10}{3}$ yd. $\div$ 5).

31. Draw an 8-inch square. In it draw a square $\frac{1}{4}$ as large. How many square inches between the two perimeters?

Relations—Ratio.

332. 1. One line is 12 ft. long, another is 3 ft. long. Compare their lengths.

(a) The 3-ft. line must be taken (repeated) —— times to make up the 12-ft. line.
(b) The 12-ft. line is —— times as long as the 3-ft. line.
(c) The 12-ft. line is composed of —— 3-ft. lines.
(d) The 3-ft. line is one —— as long as the 12-ft. line.

By comparing or measuring we find the answers required. When we know the answers to a and b, we know the *relation* (*ratio*) of 12 ft. to 3 ft. The ratio is 4.

When we know the answers to c and d, we know the ratio of 3 ft. to 12 ft. It is $\frac{1}{4}$.

2. One package weighs 2 lb., another 8 lb. Make four statements similar to the four above, and find the ratio of each weight to the other.

3. Measure your foot-rule with a 4-inch unit. Tell what you can about the ratios.

4. Find the ratio of your foot-rule to a 6-inch unit. A 2-inch unit. A 1-inch unit.

5. What is the ratio of the 6-inch unit to the foot-rule? Of the 2-inch unit? The 1-inch unit?

6. Find two ratios by comparing a yardstick and a foot-rule.

7. What two ratios can be found by comparing a gallon and a quart?

8. Draw a 2-in. square and a 4-in. square. Divide them into square inches, and find the ratio of each to the other.

9. What is the ratio of a dollar to a dime? Of a dime to a dollar?

10. Ten is how many times 2? Then what is the ratio of 10 to 2? Of 2 to 10?

11. How many times must one be taken to make ten? Then the ratio of 10 to 1 is ——, and the ratio of 1 to 10 is ——.

12. The ratio of 10¢ to ——¢ is 2. The ratio of ——¢ to 10¢ is $\frac{1}{2}$.

13. A man counting a roll of 5-dollar bills says, \$5, \$10, \$15, \$20. How many *equal parts* make up his \$20? How many *times* must one of the parts be taken to equal his \$20? What is the ratio of \$20 to \$5? Of \$5 to \$20?

14. \$50 is how many times \$10? That is, what is the ratio of \$50 to \$10?

15. Four feet is what part of 20 feet? That is, what is the ratio of 4 ft. to 20 ft?

16. Five inches is one-half of what? That is, the ratio of 5 in. to —— in. is $\frac{1}{2}$.

17. Thirty dollars is five times what? That is, the ratio of \$30 to \$—— is 5.

18. What is the ratio of $\frac{1}{2}$ ($\frac{2}{4}$) to $\frac{1}{4}$? Of $\frac{1}{2}$ to $\frac{1}{8}$? Of $\frac{1}{8}$ to $\frac{1}{4}$? Show by drawing.

19. Find the ratio of 24 to 8. Of 42 to 6.

20. By what process do you find the ratio of one number to another? (See Division.)

21. Select any number you please, and state its ratio to *one*. To *two*.

333.

ARTICLE	COST	ARTICLE	COST
1 apple	2 cents	2 apples	5 cents
5 apples	10 cents	8 apples	20 cents

Five apples are how many times 1 apple? Then they will cost how many times as much? Point out two ratios that are equal. Eight apples are how many times 2 apples? How many times as much will they cost? Point out the ratios.

1. At 3¢ each, what will be the cost of a dozen oranges?

2. When lemons are selling at the rate of 3 for 5¢, what will a dozen cost?

3. If 11 lb. of sugar cost 50¢, what will 22 lb. cost?

4. When you can buy 3 handkerchiefs for 25¢, how many can you buy for $1?

5. A lady paid 30¢ for a dozen eggs. How much would 4 eggs cost at that rate?

6. A boy running takes 3 steps every 10 ft. How many steps does he take in running 100 ft.?

7. A man earns $21 every two weeks. How much does he earn in six weeks?

8. How much do I gain by buying 10 pigs at $2 each, and selling them at $3 each?

(*a*) How much do I gain on 1 pig? On 10?

(*b*) How much do I pay for the 10 pigs? How much do I get for them? Then how much do I gain?

9. If 5 apples cost 10 cents, what is the cost of 1 apple?

10. If 4 sheep are worth \$20, what are 3 sheep worth?

11. A girl bought 3 pairs of shoes for \$6. At the same rate, what would 5 pairs cost?

12. Draw two lines showing the ratios 4 and $\frac{1}{4}$.

13. What is the ratio of a rectangle 4 in. by 5 in. to one 2 in. by 5 in.?

Review.

334. **1.** Find the cost of a ton of hay, when $\frac{3}{5}$ of a ton costs \$6.

2. 9 is $\frac{3}{5}$ of what number?

3. 15 is $\frac{3}{7}$ of what number?

4. 14 is $\frac{7}{3}$ of what number?

5. 20 is $\frac{5}{6}$ of what number?

6. $3\frac{1}{3}$ is $\frac{2}{7}$ of what number?

7. If $\frac{2}{3}$ of a yard of satin costs 80¢, what is the cost of one yard? Of 5 yards?

8. If $\frac{3}{4}$ of a ton of coal occupies 24 cubic feet, how many cubic feet will 1 ton occupy?

9. If $\frac{5}{7}$ of a barrel of fish cost \$10, what will 1 barrel cost?

10. What is the price of a dozen, when $\frac{5}{6}$ of a dozen oranges sell for 20¢?

11. 2 times $\frac{3}{8}$ are how many fourths?

12. $\frac{1}{2}$ of 18 is $\frac{1}{6}$ of what number?

13. If $\frac{3}{5}$ of a pound of rice costs 6 cents, what will 5 pounds cost?

14. What is the cost of $6\frac{1}{4}$ gallons of molasses at \$.40 a gallon?

15. A woman has 15 yards of muslin. How much will she have after she uses $14\frac{3}{4}$ yards?

16. What is the cost of $\frac{3}{5}$ of a pound of candy at 15¢ a pound?

17. What will $15\frac{1}{2}$ dozen eggs cost at 20¢ a dozen?

18. A boy after selling $\frac{1}{2}$ and $\frac{1}{5}$ of his marbles had 12 marbles left. How many had he at first?

19. A boy has $\frac{1}{2}$ of a peck of nuts. If he gives away $\frac{3}{4}$ of them, what part of a peck will he have left?

20. If $\frac{1}{2}$ of an ounce of tea costs 5¢, what will 1 pound cost?

21. Four fifths of 20 is $\frac{2}{7}$ of what number?

22. If I can buy 7 pencils for $\frac{3}{10}$ of a dollar, how many can I buy for $\frac{9}{10}$ of a dollar?

23. If $\frac{4}{5}$ of a cord of wood is sold for $4, what will 5 cords bring?

24. If $\frac{3}{4}$ of a barrel of sugar costs $12, what will $\frac{3}{8}$ of a barrel cost?

25. If $\frac{1}{12}$ of a lot of goods is worth $360, what is $\frac{1}{3}$ of the lot worth?

26. $40 is equal to $\frac{1}{6}$ of my house rent for 1 year. How much do I pay a month?

27. If $\frac{1}{8}$ of a ton of coal lasts 2 days, how long will $\frac{3}{4}$ of a ton last?

28. What will $\frac{1}{2}$ of a pound of tea cost at $\frac{3}{4}$ of a dollar a pound?

29. At $\frac{1}{4}$ of a dollar a bushel, how many bushels of apples can be bought for 10 dollars?

30. One third of a pole is blue, $\frac{1}{2}$ of it is red, and the rest is white. What part of the pole is white?

31. If $5\frac{1}{4}$ pounds of nuts are divided equally among 7 boys, what part of a pound will each boy receive?

32. When a furnace consumes coal at the rate of $\frac{4}{5}$ of a ton a day, how much will it consume in $4\frac{3}{7}$ weeks?

33. When $\frac{3}{8}$ of a yard of ribbon is put into a loop, how many loops can be made from 3 yards?

34. At $\frac{3}{4}$ of a cent a square foot, what will it cost to paint a blackboard 24 feet long and $4\frac{1}{2}$ feet wide?


If A is 1,
Can you
If A is 1
If B is 1,

COMPOUND NUMBERS.

Liquid Measure.

335. *Liquid Measure* is used in measuring liquids, as water, milk, etc.

PINT QUART GALLON

2 pints (pt.) = 1 quart (qt.).
4 quarts = 1 gallon (gal.).

1. How many pints are there in 3 qt.? In 5 qt.?
2. How many quarts are there in 3 gal.? In 10 gal.?
3. How many pints in 5 gal. 3 qt. and 1 pt.?

5 gal. = 5 × 4 qt., or 20 qt.; 20 qt. + 3 qt. = 23 qt.
23 qt. = 23 × 2 pt., or 46 pt.; 46 pt. + 1 pt. = 47 pt.

4. How many pints in 4 gal. 2 qt. 1 pt.?
5. How many gallons are there in 24 qt.? In 40 qt.?
6. How many quarts are there in 12 pt.? In 16 pt.?
7. How many gallons are there in 110 pints?

1 pt. = $\frac{1}{2}$ of a qt., and 110 pt. = 110 × $\frac{1}{2}$ qt., or 55 qt.
1 qt. = $\frac{1}{4}$ of a gal., and 55 qt. = 55 × $\frac{1}{4}$ gal., or 13 gal. and 3 qt.

8. How many gallons in 129 pints?
9. How many pints in 1 gal.? In $\frac{1}{2}$ gal.?
10. How many gallons in 40 quarts? In 75 qt.?

336. 1. How many quart jars will hold $2\frac{1}{2}$ gallons of milk?

2. How many half-pint bottles can you fill with a gallon of olive oil?

3. A milkman sold 18 gal. of milk at 6¢ a quart. How much did he get for it?

4. At 10¢ a pint, how much syrup can be bought for $3.60?

5. How many pint bottles will hold 2 gal. 1 qt. of oil?

6. If a gallon of molasses costs 80¢, how much will 6 pints cost?

7. A man bought 2 cans of mineral water, each containing a gallon and a half. The price was 20¢ a gallon. How much did he pay?

8. There are 231 cu. in. in a gallon. How many cubic inches in a quart?

9. A lady sold 2 gal. 3 qt. 1 pt. of vinegar at 6¢ a quart. How much did she get for it?

10. A man paid 52¢ for 1 gal. 2 qt. 1 pt. of milk. He paid ——¢ a quart.

11. If a family pays 8¢ a quart for milk and uses 3 pt. a day, what is the milk bill for the month of March?

12. If a barrel holds 31½ gallons, and a hogshead holds twice as much, what does a hogshead hold?

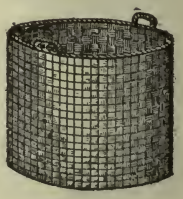
Dry Measure.

337. *Dry Measure* is used in measuring dry articles, as grain, seeds, fruit, vegetables.

PINT

QUART

PECK



BUSHEL

2 pints (pt.) = 1 quart (qt.).
8 quarts = 1 peck (pk.).
4 pecks = 1 bushel (bu.).

1. How many pints in 3 qt.? In 5 qt.?
2. How many qt. in 4 pk.? In 5 pk.?
3. How many pk. in 3 bu.? In 7 bu.?
4. How many quarts in 5 bu. 3 pk. 4 qt.?
5. How many pecks in 8 bu. 3 pk.?
6. How many pecks in 32 qt.? In 20 qt.?
7. How many bushels in 4096 pints?
8. How many pecks in $\frac{1}{2}$ bu.? In $\frac{1}{4}$ bu.?
9. In $32\frac{1}{2}$ pecks how many bushels?
10. In 784 quarts how many bushels?

338. 1. When potatoes are worth 80¢ a bushel, what is $\frac{1}{2}$ peck worth?

2. If apples are selling at 10¢ a quarter-peck, how much will a bushel cost?

3. A boy sold $\frac{1}{2}$ bu. of berries at 5¢ a quart. He received ——¢ for them.

4. Two bushels of cherries were divided equally among 4 persons. How many quarts did each receive?

5. A man bought 5 bu. 3 pk. of corn at 40¢ a bushel. How much did it cost him?

6. How many peck baskets can you fill with 64 qt. of onions?

7. A woman bought 2 bu. 1 pk. 3 qt. of strawberries at 5¢ a quart. She paid for them with a $5-bill, and got $—— in change.

8. How many pint packages can a seedsman make from 2 bu. 2 pk. and 2 qt. of seeds?

9. A grocer bought $10\frac{1}{2}$ bu. of apples at 60¢ a bushel, and sold them at 10¢ a half-peck. What was his profit on them?

Avoirdupois Weight.

339. *Avoirdupois Weight* is used in weighing all common articles.

16 ounces (oz.) = 1 pound (lb.).
2000 pounds = 1 ton (T.).

1. How many ounces in 4 lb.? In $2\frac{1}{2}$ lb.?
2. In 2 lb. 8 oz. how many ounces?
3. What part of a pound are 4 oz.? 10 oz.?
4. How many pounds in 160 ounces? In 336 oz.?
5. What part of a ton is 500 lb.? 200 lb.?
6. A barrel of flour weighs 196 lb. What is the weight of a sack of flour containing $\frac{1}{4}$ of a barrel?
7. A bushel of wheat weighs 60 lb. What does a peck weigh?
8. From a firkin of butter containing 42 lb. a grocer sold 13 lb. 10 oz. How much was left?

lb.	oz.		lb.	oz.
42	0	=	41	16
13	10	=	13	10
28	6		28	6

We cannot take 10 oz. from 0 oz, so we take 1 lb. from the 42 lb. and change it to ounces. Then 16 oz. — 10 oz. = 6 oz., and 41 lb. — 13 lb. = 28 lb.

9. A butcher sold 24 lb. 12 oz. of lard from a can containing 40 lb. How much was left?
10. One crock of butter weighed 8 lb. 10 oz., and another 9 lb. 14 oz. How much did both weigh?

340. 1. Find the cost of $3\frac{1}{4}$ lb. of cheese at 12¢ a pound.

2. What will 3 lb. 8 oz. of butter cost at 20¢ a pound?

3. How many hundred pounds make a ton?

4. If hay is worth \$20 a ton, what is 100 lb. worth?

5. A bushel of wheat weighs 60 lb. How many bushels in a bag weighing 120 lb.?

6. A bin contains $6\frac{1}{2}$ bu. of wheat. What is the weight of the wheat?

7. Three boys bought 2 lb. 4 oz. of candy. Each paid 15¢. How many ounces should each one receive?

8. If a man eats 3 8-ounce loaves of bread in one day, how many pounds will he eat in one week?

9. A bushel of oats weighs 32 lb. Find the weight of 2 bu. 2 pk.

10. A sack of oats weighs 96 lb. What is it worth at 30¢ a bushel?

11. At \$4 a ton, how much coal can be bought for \$25?

12. What is the value, at \$2 a ton, of 7000 lb. of coal?

Time Measure.

341. *Time Measure* is used in measuring duration.

60 seconds (sec.) = 1 minute (min.).
60 minutes = 1 hour (hr.).
24 hours = 1 day (da.).
7 days = 1 week (wk.).
365 days = 1 year (yr.).
12 months (mo.) = 1 year.

1. How many seconds are there in 5 min.? In 10 min.?

2. How many hours are there in 2 da.? In $\frac{1}{2}$ da.?

3. How many days are there in 2 weeks? In 4 wk?

4. How many days are there in 4 wk. 3 da.?

5. How many hours in 240 min.? In 180 min.?

6. 100 years make 1 century. How many centuries in 1900 yr.?

7. In $1\frac{1}{2}$ hr. how many minutes?

8. What part of a day is 6 hours? 16 hours?

9. How many days in this month? How many weeks?

342. 1. How many days in 52 weeks? Then a year is how much longer than 52 weeks?

2. How long is it from Christmas to New Year's Day?

3. How many months is it from one Christmas to another?

4. How many years and months have you lived?

5. How many weeks and days in May?

6. How many times does the clock strike 12 every day?

7. When we have daylight 14 hours, how long is the night?

8. How many centuries are there between 1300 and 1900?

9. If you go to bed at 9 o'clock at night and get up at 6 in the morning, how long are you in bed?

10. Eight hours is what part of a day? 16 hr.?

11. Cousin Fred came to our house on Monday and stayed 2 weeks. On what day did he start home?

12. If a train runs 30 miles an hour, how far does it run in 2 hours and a half?

13. How many times does the second hand of a watch go around while the minute hand goes once around?

14. While the hour hand goes once around, the minute hand goes around —— times.

15. How often does the hour hand go around in a day? The minute hand?

16. How many minutes in $\frac{3}{4}$ of an hour?

17. Are the two hands of a clock together 12 times or 13 times in 12 hours?

18. If a boy saves 10¢ a day, how much will he save in a year?

19. If a man earns $30 a month, how much does he earn in a year?

20. A girl walked $\frac{1}{2}$ mile and back in 20 minutes. How far would she walk in an hour at that rate?

21. How many days is it from October 24 to November 3? From Dec. 25 to Jan. 10?

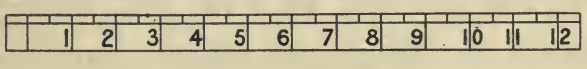
22. If a man gets $2 for working 8 hours, how much should he get for 44 hours?

23. If a horse can trot a mile in 3 minutes, how far can he trot in an hour?

24. If a boy walks 3 miles an hour, how far does he walk in 4 hr. 40 min.?

Long Measure.

343. *Long Measure* is used in measuring lines and distances.



12 inches (in.) = 1 foot (ft.).
3 feet = 1 yard (yd.).
$5\frac{1}{2}$ yards, $16\frac{1}{2}$ feet = 1 rod (rd.).
320 rods = 1 mile (mi.).

How many feet are there in 5 yards? In $\frac{1}{2}$ of a yard? In $5\frac{1}{2}$ yards?

A distance of $5\frac{1}{2}$ yards is called a *rod*. How many feet in a rod?

A barn 4 rods long is how many yards in length? How many feet?

How many rods long is your schoolroom? Find by measuring.

Find the perimeter of a field 32 rods long and 25 rods wide.

Name a place about a mile from your home. One about 2 miles. One about half a mile.

A distance of 320 rods is called a mile. How many rods in $\frac{1}{2}$ of a mile?

In $\frac{1}{4}$ of a mile there are —— rods; in $\frac{3}{4}$ of a mile there are —— rods.

What part of a mile is 160 rods? 80 rods?

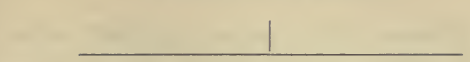
Complete:

1. 1 rd. 2 yd. = —— yd.
2. 3 ft. 2 in. = —— in.
3. 2 yd. 1 ft. = —— ft.
4. 1 yd. 4 in. = —— in.
5. 2 rd. 2 ft. = —— ft.
6. 1 mi. 40 rd. = —— rd.
7. 6 yd. 2 ft. = —— ft.
8. 1 rd. 8 ft. = —— ft.
9. 1 mi. 80 rd. = —— mi.
10. 1 yd. 1 ft. 1 in. = —— in.

344. If you walk 20 rd. a minute, how long will it take you to walk a mile?

What is the perimeter of a field 80 rods square?

If a boy walks a mile to school in 20 minutes, he walks at the rate of —— rods a minute or —— miles an hour.



What is the length of this line? If 1 inch represents 3 feet, what does the line represent? Then to what scale is the line drawn?

A line 6 in. long is drawn to the scale of 1 inch to 3 feet. What length does the line represent?

Draw a line $5\frac{1}{2}$ in. long. Let each inch represent 3 feet. What length does the whole line represent?

What would the line represent if the scale were 12 feet to 1 inch?

Making each inch represent 10 feet, draw a line to represent 30 feet. 40 feet. 25 feet.

A field is 48 rods long and 36 rods wide. Represent it on a scale of 12 rods to the inch.

A township in some states is a mile square. Draw a map of one on a scale of 1 inch to 80 rods.

345. **1.** A room 18 ft. long is how many yards long?

2. A fence is 11 yards or —— feet or —— rods long.

3. The perimeter of a rectangle is 40 feet. If the length is 12 feet, what is the width?

4. Ten rods is how much greater length than 50 yards?

5. Find the distance around the schoolhouse in feet. In yards. In rods.

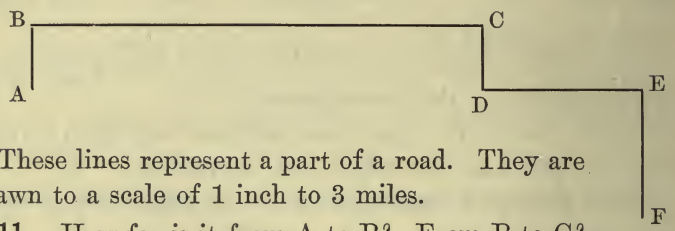
6. Frank can walk 3 miles in an hour. In what time can he walk 160 rods?

7. A room is $16\frac{1}{2}$ ft. square. What is the distance around it?

8. What part of a yard is 1 ft. 6 in.?

9. How many feet and inches in $\frac{1}{2}$ of a rod?

10. The distance to the moon is 240,000 miles. If a bullet traveled 1000 miles an hour, it would reach the moon in —— hours.



These lines represent a part of a road. They are drawn to a scale of 1 inch to 3 miles.

11. How far is it from A to B? From B to C?

12. How many miles is it from D to E? From C to D?

13. Find the distance from F to C. From F to A.

14. The distance from E to D is what part of the distance from B to C?

15. A man wishes to drive from A to C. When he reaches B, what part of the distance has he gone?

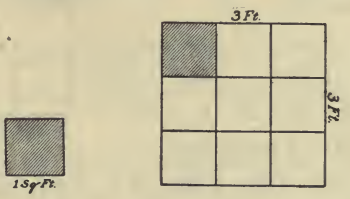
16. If the wheels of a bicycle turn twice around in going one rod, how many times will they turn in going from F to E?

17. A room is 18 ft. long and 15 ft. wide. The carpet is laid lengthwise and is a yard wide. How many strips are there on the floor? What is the length of each strip? How many yards in all the strips?

18. If the carpet is a yard wide, and is laid lengthwise, how many yards will cover the floor of a room 12 ft. wide and 16 ft. long?

Square Measure.

346. *Square Measure* is used in measuring surfaces.



144	square inches (sq. in.)	= 1 square foot (sq. ft.).
9	square feet	= 1 square yard (sq. yd.).
$30\frac{1}{4}$	square yards	= 1 square rod (sq. rd.).
160	square rods	= 1 acre (A.).

We have learned what a square foot is. Draw one, and divide it into square inches.

How many square inches in one row? In all rows?

Then how many square inches make 1 square foot?

How many square inches in 2 sq. ft.? In $\frac{1}{2}$ of a square foot?

What part of a square foot is 72 sq. in.? 36 sq. in.?

How many square feet are there in 288 sq. in.?

Draw a square yard, divide it into square feet, and find how many square feet make 1 square yard.

In 2 sq. yd. how many square feet? In 5 sq. yd.?

A square 1 rod long and 1 rod wide is called a *square rod.*

How many square rods in a garden 5 rd. long and 3 rd. wide? Make a map of the garden, letting 1 inch represent a rod.

Areas.

347. The *Area* of a surface is the number of square units of measure it contains.

If each side of one of the small squares in the figure is *one inch* long, then each part is 1 square inch (square unit of measure).

The area of the strip AB is 4×1 sq. in., or 4 sq. in., and the total area is 3×4 sq. in., or 12 sq. in.

The area of a rectangle is expressed by the product of the numbers that represent its length and width.

348. 1. How many square feet in a strip of carpet a yard wide and 10 yards long?

2. A table is 6 ft. long and 3 ft. wide. It contains —— sq. ft., or —— sq. yd.

3. How many square feet of oilcloth will cover a floor 15 ft. square? How many square yards?

4. Find how many square yards would be needed to cover your kitchen at home. What would it cost at 30¢ a square yard?

5. A lot is 16 rd. long and 5 rd. wide. How many square rods in it? What part of an acre?

6. What part of an acre is 40 sq. rd.? 120 sq. rd.?

7. In 2 acres how many square rods? In 5 A.? In 10 A.?

8. An acre and 40 sq. rd. = —— A.

9. A field is 16 rd. by 20 rd. How many acres in it?

10. A rug is 9 feet square. How many square feet in it?

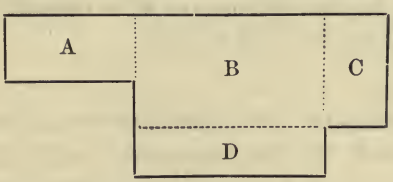
11. The area of a rectangle 8 ft. long is 40 sq. ft. What is the width?

12. The perimeter of a square is 12 yards. What is the area in square feet?

13. A rectangular lot is 50 ft. by 75 ft. The house on the lot is 25 ft. by 50 ft. How many square feet are there in the yard?

14. How many square inches are there in the surface of a common brick, which is 8 inches long, 4 inches wide, and 2 inches thick?

15. A farmer wishes to make a grain bin 8 ft. long, 5 ft. wide, and 4 ft. deep. How many square feet of boards will he have in the bottom? In one end? In one side?



This figure is drawn to a scale of 12 ft. to 1 inch.

349. To find the area of the entire figure we divide it into four rectangles and find the area of each separately.

1. What is the length of A? The width? The area in square feet? In square yards?

2. Find the area of B in square feet. In square yards.

3. What is the area of C? The area of D?

4. Find the area of the entire figure in square yards.

5. How does the area of A compare with that of C?

6. A is what part of D? D is what part of B?

7. What part of the entire figure is B? What part is D?

8. Copy the figure, omitting the dotted lines. Make other dotted lines dividing the figure into 3 rectangles. Find the area of each rectangle.

350. Draw a rectangle 4 in. long and 3 in. wide, and divide it into square inches. How many sq. in. have you?

Draw another rectangle 6 in. long and 2 in. wide. Is its area equal to that of the first rectangle? Has it the same *dimensions* (length and width)?

Draw a third rectangle 12 in. long and wide enough to have the same area. What is its width?

Draw a rectangle 6 in. by 8 in. Draw another twice as long, but only half as wide. Are their areas equal?

Draw another twice as wide as the first, but only half as long. Compare the areas.

What may be the dimensions of a rectangle containing 24 sq. ft.? 36 sq. ft.? 64 sq. ft.?

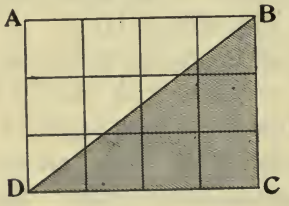
Complete:

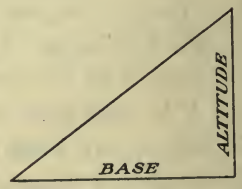
A rectangle 6 in. by 3 in. equals another 3 in. by —— in.
A rectangle 20 ft. by 2 ft. equals another 10 ft. by —— ft.
A rectangle 5 in. by 4 in. equals another $2\frac{1}{2}$ in. by —— in.

A rectangle 4 in. by 7 in. is how many times one that is 2 in. by 7 in.?

A rectangle that is 6 in. by 5 in. is what part of one that is 9 in. by 5 in.?

How many rectangles each 2 in. by 3 in. are equal to one that is 6 in. by 3 in.? To one 10 in. by 3 in.?





351. Point out the base of the shaded triangle. The altitude.

What part of the rectangle is the triangle?

What is the area of the rectangle? What, then, must be the area of the triangle?

The area of the rectangle is 3×4 sq. units.

The area of the triangle is $\frac{1}{2}$ of 3×4 sq. units.

The area of a triangle is expressed by one-half of the product of the numbers that represent its base and altitude.

1. If the base of a triangle is 6 inches and the altitude 3 inches, what is its area?

$\frac{1}{2}$ of (3×6) sq. in. $= 9$ sq. in.

Find the area of the following triangles:

2. Altitude 8 inches, base 6 inches.

3. Altitude 10 inches, base 8 inches.

4. Altitude 12 inches, base 12 inches.

5. Altitude 9 inches, base 16 inches.

6. Altitude 5 inches, base 3 inches.

Cubic Measure.

352. *Cubic Measure* is used in measuring solids.

1728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.).
27 cubic feet = 1 cubic yard (cu. yd.).

Figure 1 represents a cubic inch. Each face is an inch square. Is each face a rectangle?

Suppose Fig. 1 is drawn to a scale of 1 foot to 1 inch. Then OD represents what length?

What is the area of each face? Does the figure represent a *cubic foot?*

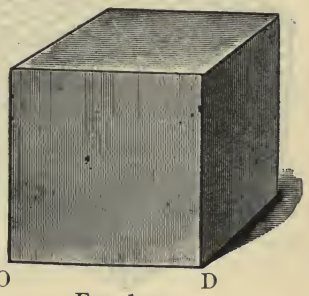


FIG. 1.

A solid that is 1 foot long, 1 foot wide, and 1 foot thick is called a *cubic foot.*

Find a block of wood, a stone, or a box that is about as large as a cubic foot.

Suppose Fig. 1 is drawn to a scale of 1 inch to 3 feet, or 1 yard. Then OD represents what length?

What is the area of each face? Does the figure represent a *cubic yard?*

A solid that is 1 yard long, 1 yard wide, and 1 yard thick is called a *cubic yard.*

353. Figure 2 represents a cubic yard. If we cut it into cubes as indicated, what will be the size of each cube?

Each cube is a cubic foot. How many of them are there in one layer? In the 3 layers? Then how many cubic feet in a cubic yard?

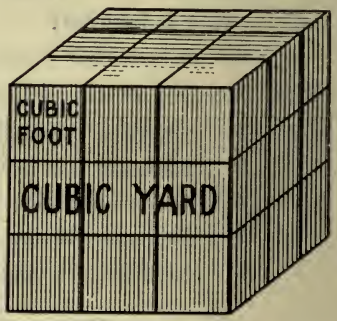


Fig. 2.

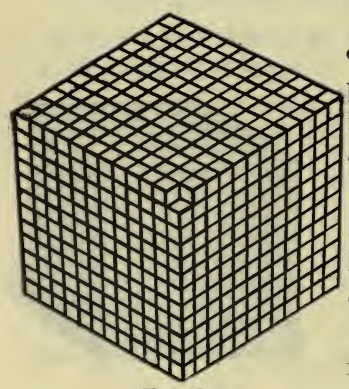


Fig. 3.

354. Fig. 3 represents a cubic foot. If we cut off a piece an inch thick and divide it into inch cubes, how many of them shall we have?

How many such pieces can be cut from a cubic foot? Then how many cubic inches in a cubic foot?

A cubic yard is 3 ft. long, 3 ft. wide, and 3 ft. thick. Find the value of $3 \times 3 \times 3$. Is the product the *number* of cubic feet in a cubic yard?

What are the dimensions of a cubic foot? Find the value of $12 \times 12 \times 12$, and compare it with the *number* of cubic inches in a cubic foot.

Find how many cubic inches in a cube that measures 4 inches on each side. Build the cube with blocks (inch cubes).

Volumes.

355. How many faces has a cube? Are they all equal? Is each face a *rectangle?*

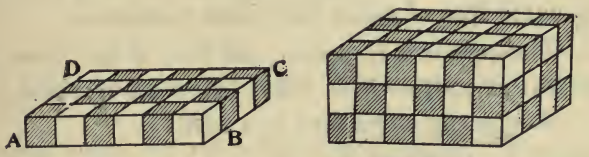


FIG. 4

Figure 4 represents a solid 6 inches long, 4 inches wide, and 3 inches thick.

How many faces has the solid? Is each face a rectangle?

A solid bounded by 6 rectangles is called a *rectangular solid.*

In Figure 4 each little cube represents 1 cubic inch. Find how many cubic inches there are.

There are three layers, each containing 4 rows of the little cubes, as ABCD. Each row contains 6 little cubes, or *cubic inches*, hence the 4 rows contain 24 cubic inches.

Since there are 24 cu. in. in each layer, in the 3 layers there are 3×24 cu. in., or 72 cu. in., which is the volume.

Find the value of $6 \times 4 \times 3$. Does the product equal the *number* of cubic inches in Fig. 4? $(6 \times 3 \times 4) \times$ 1 cu. in. = —— cu. in.

The volume of a rectangular solid is expressed by the

product of the numbers that represent its length, breadth, and thickness.

The number of cubic units (cu. in., cu. ft., cu. yd., etc.) in a solid is called its *volume*.

1. How many cubic inches in a brick 8 in. long, 4 in. wide, and 2 in. thick?

2. How many cubic feet in a wall 16 ft. long, 4 ft. high, and 2 ft. thick?

3. A hole is 3 ft. long, 2 ft. wide, and 6 ft. deep. How many cubic feet of earth have been removed?

4. A cistern is 6 ft. square and 9 ft. deep. How many cubic feet of water will it hold? How many cubic yards?

5. How many cubic feet in a cord?

A pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high is called a *cord*.

6. How many cords are there in a pile of wood 16 ft. long, 4 ft. wide, and 4 ft. high?

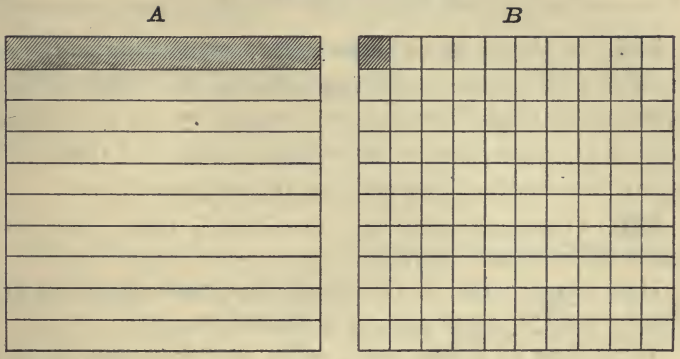
7. A cubic foot of water weighs 1000 oz. What is the weight of a cubic yard of water?

8. Find the dimensions of a box that will hold 24 cu. in. of water.

9. What are the width and depth of a cistern 6 ft. long that will hold 144 cu. ft. of water?

10. An ice box holds 20 cu. ft. of ice. It is 4 ft. long and 2 ft. deep. How wide is it?

Decimal Fractions.



356. What part of A is dark? Into how many parts is each strip divided in B?

What part of each strip is the shaded square? What part of the large square?

Then $\frac{1}{10}$ of one-tenth of B is one —— of B.

When anything is divided into ten equal parts, what is each part called?

When each of these ten parts is divided into ten parts, how many parts are there?

When each of these hundred parts is divided into ten parts, how many parts are there?

When anything is divided into *tenths*, *hundredths*, *thousandths*, etc., the parts are called *decimal* parts; that is, *tenth-parts*.

357. You have already learned that 10 hundredths make 1 *tenth*, and that 10 tenths make 1 *one*, just as 10 ones make 1 ten, 10 tens 1 hundred, and so on. You have also learned that tenths and hundredths may be written *with* the decimal point and *without* denominators. Fractions so written are called **Decimals** or **Decimal Fractions.**

358. *Tenths* must stand next to *ones*, because 10 of them make 1 *one; hundredths* next to tenths, because 10

of them make 1 *tenth*. Next to hundredths we must write *thousandths*, because 10 of them make 1 hundredth, etc.

359. In decimals, as in integers (whole numbers), the *position* of the figures indicates their value. Thus, in 3.15 we know that the 1 is one-tenth, because tenths are written only in the *first place* to the right of ones; and that the 5 is five hundredths, because it is in the *second* place.

360. One-tenth of a cent is called a *mill;* then how many mills make 1 cent?

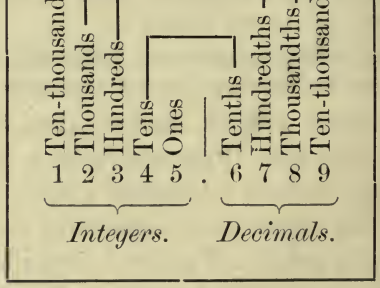
How many mills in 10 cents? In 100 cents, or $1? Then 1 mill is what part of a dollar?

What part of a cent are 5 mills, or 5 thousandths of a dollar?

In $.125, how many dimes, cents, and mills? Which figure is in tenths' place? In hundredths'? In thousandths'?

How many mills make 1 cent, or 1 hundredth of a dollar?

How many mills in 1 dime? In 2 cents? Then may $.125 be read as 125 mills, or as 125 thousandths of a dollar?



361. Examine this table. *Ten* of any order make *one* of the next higher order. With reference to *ones*, where

are tens and tenths written? Hundreds and hundredths? In what place is the 8? What does it express?

In the decimal .125, there are 1 tenth, 2 hundredths, and 5 thousandths, or 125 thousandths. When there are no tenths or hundredths, we write thousandths in the third place, and put ciphers in the first two places.

Thus, 5 thousandths is written .005.

What decimal place is occupied by tenths? By thousandths? By hundredths?

What occupies the second decimal place? The fourth? The third?

Extend the table, and tell what occupies the fifth place. The sixth place.

362. In reading integers we omit the name, which is *ones*, the name of the lowest integral order. Decimals are read just as integers are, except that the name of the lowest decimal order is given.

In reading an integer and decimal, use the word *and* between the integral and decimal parts of the number, but nowhere else.

325.46	is read	325	and	46	hundredths.
73.05	is read	73	and	5	hundredths.
.08	is read			8	hundredths.
517.325	is read	517	and	325	thousandths.
82.073	is read	82	and	73	thousandths.
716.0034	is read	716	and	34	ten-thousandths.

363. Read the following:

1.	.7	10.	.225	19.	278.35
2.	.15	11.	.600	20.	51.07
3.	.38	12.	.012	21.	39.50
4.	.03	13.	.708	22.	624.054
5.	.44	14.	.1325	23.	516.0027
6.	.044	15.	.4016	24.	88.0008
7.	.444	16.	.7203	25.	200.0200
8.	.707	17.	.0518	26.	765.4004
9.	.005	18.	.0024	27.	394.3275

364. Write 7 thousandths as a decimal.

Thousandths occupy the third place, hence we write the 7 and put ciphers in the first two places, thus: .007.

Express 25 thousandths as a decimal.

25 thousandths = 2 hundredths and 5 thousandths. There are no tenths, hence we put a cipher in the first place, thus: .025.

Write as decimal fractions:

5 tenths	216 thousandths	75 thousandths
7 hundredths	103 thousandths	40 thousandths
42 hundredths	68 hundredths	90 hundredths
8 thousandths	50 hundredths	6 thousandths
36 thousandths	9 thousandths	82 thousandths

5 and 37 hundredths	46 and 7 thousandths
24 and 5 hundredths	75 and 14 thousandths
17 and 9 tenths	8 and 125 thousandths
32 and 8 hundredths	92 and 8 thousandths
40 and 40 hundredths	72 and 72 thousandths

Addition and Subtraction.

365. **1.** Add .7, .42, .05, 2.7, and 15.48.

.7
.42
.05
2.7
15.48
19.35

Are the tenths all written in the same column? Where are the hundredths written? How are the decimal points arranged?

Are decimals added just as integers are added?

2. Subtract .17 from .56, and .24 from .8.

.56 .8
.17 .24
.39 .56

Are tenths written in one column? Can you take 4 hundredths from *no* hundredths? What must you do? Do we subtract as in whole numbers?

Add:

3	4	5	6
42.3	13.256	7.0296	.032
16.07	6.09	5.724	.85
5.45	54.307	38.602	.027
.08	8.9	3.08	.645
24.06	36.005	6.7043	.930

Subtract:

7	8	9	10	11
37.42	51.63	7.15	.672	.0072
12.51	28.35	6.47	.348	.0036

12	13	14	15	16
2.57	5.02	16.3	.207	.87
.39	2.75	2.14	.0525	.254

Find the value of:

17.	$72.5 + .324 + 5.07$	**23.**	$6.08 + .027 - 4.44$
18.	$61.3 + 2.79 + .008$	**24.**	$8.72 + .803 - .75$
19.	$26.7 + 41.3 + .802$	**25.**	$3.60 + 34.2 - .016$
20.	$5.34 + .534 + 53.4$	**26.**	$.542 + 7.61 - 3.25$
21.	$.016 + 0.16 + .024$	**27.**	$9.27 - 3.45 - .005$
22.	$7.03 + .300 + 5.04$	**28.**	$.172 + 61.5 - 2.64$

Multiplication and Division.

366. How many tenths are 5×6 tenths? 30 tenths are equal to how many ones? $3.0 = 30$ tenths.

How many tenths are 8×5 tenths? 40 tenths $=$ —— ones.

$5 \times .6 = 30$ tenths, or 3. 8×5 tenths $= 40$ tenths, or 4.

In 25 tenths, how many ones and tenths?

1. Multiply 4.2 by 6.

$$\begin{array}{r} 4.2 \\ 6 \\ \hline 25.2 \end{array}$$

6×2 tenths $= 12$ tenths, or 1.2. Where do we write the 2? What is done with the 1? Do we multiply as in whole numbers? How many decimal places in the factors? How many in the product?

There must be as many decimal places in the product as there are in both factors.

Find the products:

2.	5×3.7	**7.**	$2 \times .24$	**12.**	4×1.36
3.	7×2.3	**8.**	$5 \times .13$	**13.**	7×3.35
4.	4×5.6	**9.**	$4 \times .23$	**14.**	3×8.72
5.	6×1.7	**10.**	$7 \times .14$	**15.**	$.12 \times .48$
6.	8×4.2	**11.**	$8 \times .06$	**16.**	2.4×1.2

17. Multiply .14 by .7.

.14
.7
.098

$7 \times 14 = 98$, only two places. What must we do to make *three* places? How do we know there should be three decimal places?

Find the products:

18.	$.5 \times .5$	**23.**	$12.5 \times .5$	**28.**	$.48 \times .4$
19.	$.8 \times .4$	**24.**	$16.3 \times .2$	**29.**	$.25 \times .5$
20.	$.6 \times .6$	**25.**	$24.6 \times .3$	**30.**	$.32 \times .3$
21.	$.9 \times .3$	**26.**	$33.2 \times .4$	**31.**	$.17 \times .5$
22.	$.7 \times .8$	**27.**	$53.2 \times .5$	**32.**	$.55 \times .3$

33. Multiply 142 by .06.

142
.06
8.52

How many decimal places in the factors? Then how many must we point off in the product?

Multiply:

34.	125 by .03	**39.**	376 by .05
35.	234 by .06	**40.**	428 by .03
36.	145 by .05	**41.**	706 by .06
37.	421 by .04	**42.**	250 by .07
38.	845 by .06	**43.**	625 by .05

367. What is $\frac{1}{2}$ of 8 tenths? $\frac{1}{2}$ of $.8 =$
What is $\frac{1}{3}$ of 9 tenths? $\frac{1}{3}$ of $.9 =$
What is $\frac{1}{4}$ of 24 hundredths? $\frac{1}{4}$ of $.24 =$
What is $\frac{1}{2}$ of 18 tenths? $\frac{1}{2}$ of $1.8 =$
What is $\frac{1}{3}$ of 36 tenths? $\frac{1}{3}$ of $3.6 =$

Copy and find:

1.	$\frac{1}{2}$ of .6	**4.**	$\frac{1}{2}$ of 2.4	**7.**	$\frac{1}{2}$ of 36 tenths, or 3.6
2.	$\frac{1}{4}$ of .8	**5.**	$\frac{1}{3}$ of 3.9	**8.**	$\frac{1}{4}$ of 52 tenths, or 5.2
3.	$\frac{1}{3}$ of .6	**6.**	$\frac{1}{4}$ of 8.4	**9.**	$\frac{1}{3}$ of 42 tenths, or 4.2

Copy and complete:

10.	3) 126	3) 12.6	3) 13.5	3) 13.8
11.	4) 168	4) 16.8	4) 17.2	4) 17.6
12.	6) 126	6) 12.6	6) 13.2	6) 14.4
13.	8) 168	8) 16.8	8) 17.6	8) 18.4
14.	7) 217	7) 21.7	7) 22.4	7) 23.1
15.	4) 568	4) 56.8	4) 57.2	4) 59.6

16. Divide 75 by 4.

$$4)\ 75.00 \qquad 18.75$$

7 tens ÷ 4 = 1 ten, and 3 tens remaining.
35 ones ÷ 4 = 8 ones, and 3 ones remaining.
3 ones and 0 tenths = 30 tenths. 30 tenths ÷ 4 = 7 tenths, and 2 tenths remaining. 2 tenths and 0 hundredths = 20 hundredths. 20 hundredths ÷ 4 = 5 hundredths.

Find the quotients:

17.	$49 \div 4$	**21.**	$71 \div 5$	**25.**	$121 \div 8$
18.	$67 \div 4$	**22.**	$79 \div 4$	**26.**	$130 \div 8$
19.	$53 \div 4$	**23.**	$35 \div 2$	**27.**	$146 \div 4$
20.	$66 \div 5$	**24.**	$87 \div 2$	**28.**	$255 \div 6$

368. How many tenths in 1? In 2? In $\frac{1}{2}$? In $2\frac{1}{2}$?
How many hundredths in 1? In $\frac{1}{2}$? In $\frac{1}{4}$?
Write as decimals: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{1}{10}$, $\frac{3}{10}$.
How many thousandths in 1? In $\frac{1}{2}$? In $\frac{1}{8}$?
Write as decimals: $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{7}{8}$, $\frac{25}{1000}$.
Change to common fractions: .5, .25, .75, .2, .075.

The following exercises will show you that—

(a) *Moving the decimal point one place to the right multiplies* a number by 10.

(b) *Moving the decimal point one place to the left divides* a number by 10.

1. $10 \times 2.5 = 25.$
2. $10 \times 1.25 = 12.5$
3. $10 \times .25 = 2.5$
4. $10 \times .5 = 5.0$
5. $10 \times .05 = .5$
6. $25.0 \div 10 = 2.5$
7. $12.5 \div 10 = 1.25$
8. $2.5 \div 10 = .25$
9. $5.0 \div 10 = .5$
10. $.5 \div 10 = .05$

Find the products and quotients by moving the decimal point:

11. 10×2.7
12. 10×2.45
13. $10 \times .36$
14. $10 \times .8$
15. $10 \times .07$
16. 10×1.03
17. $27 \div 10$
18. $24.5 \div 10$
19. $3.6 \div 10$
20. $8. \div 10$
21. $.7 \div 10$
22. $10.3 \div 10$
23. 10×4.265
24. 10×30.74
25. 10×261.7
26. 375×10
27. 625.4×10
28. 71.68×10

Complete the following and show that—

(c) *Moving the decimal point two places to the right multiplies* a number by 100.

(d) *Moving the decimal point two places to the left divides* a number by 100.

29. $100 \times 25.0 =$
30. $100 \times 1.25 =$
31. $100 \times 12.5 =$
32. $100 \times .125 =$
33. $100 \times .042 =$
34. $100 \times .005 =$
35. $100 \times 3.07 =$
36. $100 \times .5 =$
37. $100 \times .25 =$
38. $100 \times .05 =$
39. $2500 \div 100 =$
40. $125 \div 100 =$
41. $1250 \div 100 =$
42. $12.5 \div 100 =$
43. $4.2 \div 100 =$
44. $.5 \div 100 =$
45. $307 \div 100 =$
46. $50 \div 100 =$
47. $25 \div 100 =$
48. $5 \div 100 =$

369. 1. Divide .098 by .7.

.098 ÷ .7 = .14 Is .098 the *product* of .7 (the divisor) and .14 (the quotient)? Does it contain as many decimal places as both the factors.

The dividend contains 3 decimal places, the divisor 1. How many must the quotient contain?

There must be as many decimal places in the quotient as the number of such places in the dividend exceeds the number in the divisor.

Find the products:

1. .6 × .7
2. .3 × .15
3. .5 × 4.3
4. 3.6 × .9
5. .7 × .05
6. .9 × .017
7. 310 × .05

Find the quotients:

8. .42 ÷ .6
9. .45 ÷ .3
10. 2.15 ÷ .5
11. 3.24 ÷ .9
12. .035 ÷ .7
13. .0153 ÷ .9
14. 15.50 ÷ .05

370. Another name for hundredths is *per cent.* Instead of saying 5 hundredths of $250, we may say 5 per cent of $250.

To find 1 hundredth of a number we divide it by 100. Hence, to find 1 per cent of a number we divide the number by 100.

What is the easiest way to divide by 100?

1. Find 1 per cent of $125.

$$\$125 \div 100 = \$1.25.$$

2. Find 1 per cent of $275. Of $325. Of $152.50.

3. What is 1 per cent of $200? What is 2 per cent of $200?

4. Find 2 per cent of $300. Of $500. Of $250.

5. What is 3 per cent of \$217.50? Of \$187.50?

6. When you know what 1 per cent of a number is, how do you find 4 per cent of the number?

7. Find 4 per cent of \$732.50. Of \$364.25.

8. What is 6 per cent of \$75? Of \$87.25?

9. Find 5 per cent of 200. Of 800. Of 24.5.

10. What per cent of a number equals 100 hundredths of the number?

11. Multiply \$125 by .05, and compare the product with 5 per cent of \$125.

12. Find 6 per cent of \$240; multiply \$240 by .06. Are the results equal?

13. Compare .04 × \$325 with 4 per cent of \$325. Are they equal?

14. In how many ways can you find a per cent of a number?

15. If you borrow money, do you have to pay anything for its use?

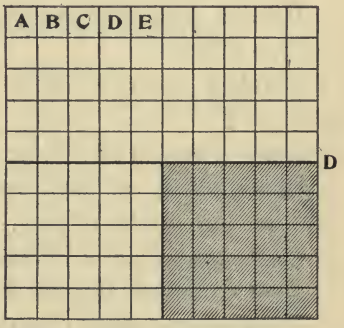
16. Find out at home all you can about what is paid for the use of money.

Percentage.

371. This square is divided into —— equal parts. Each part is 1 —— of the square.

What part of the square is A + B?

How many hundredths of the square in each horizontal strip? Each strip is what part of the square?



Instead of hundredths we may use the term *per cent*, because per cent means *hundredths*.

Then what per cent of the square is A? A + B?

How many per cent are there in the square? In anything?

One hundred per cent of a number is the number itself.

What per cent of the square is above the line RD? What part of anything is 50 per cent of it?

What part of the square is shaded? What per cent of it is shaded?

How many small squares in 10 per cent of the large square? In 20 per cent?

The sign % stands for the term *per cent*, and means either *per cent* or *hundredths*. Thus, 5% of the square means 5 per cent, or 5 hundredths of it.

What per cent of the square is A + B + C + D + E?

What part of the square is 10% of it? 20%? 40%? 50%? 60%? 6%?

Cover 25% of the square. What % is not covered?

372. What % of \$100 is \$5? \$10? \$25?

Draw a rectangle and divide so as to show 50% of it. 25%. $12\frac{1}{2}$%.

Divide a square so as to show that $50\% = \frac{1}{2}$, and that $25\% = \frac{1}{4}$.

Draw a line an inch long, and another line 50% as long.

This line is an inch long. ————————. Draw another line 100% as long.

How many times a number is 200% of it? 300%?

$\frac{1}{10}$ of a number is what % of it?

How do you find 1 hundredth, or 1%, of a number?

What is the effect of moving the decimal point two places to the left?

When you have found 1% of a number, how do you find 3% of it? 5%?

Find 1% of 200. Of 500. Of 250. Of 12.5.

Find 5% of 200. Of 125. Of 315. Of 41.2.

State the simplest way of finding 10%, or $\frac{1}{10}$, of a number. What is the effect of moving the decimal point one place to the left?

Find 10% of 50. Of 12.5. Of 345. Of 624.

What is the ratio of 200% to 100%? 100% to 50%? 25% to 100%?

What is 100% of 5¢? Of $10? Of 25 gal.?

373. 1. Find $2\frac{1}{2}$% of $400.

1% of $400 = $4.00.

$2\frac{1}{2}$% of $400 = $2\frac{1}{2} \times$ $4.00, or $10.

Find:

2. $1\frac{1}{4}$ % of $1200.
3. $12\frac{1}{2}$ % of $600.
4. $16\frac{2}{3}$ % of 120 bu.
5. 17 % of $320.
6. $33\frac{1}{3}$ % of 900 ft.
7. $2\frac{1}{5}$ % of $1500.
8. $\frac{1}{5}$ % of $1000.
9. $\frac{3}{4}$ % of $2000.

374. Be sure you understand the following:

100 % of a number = *all* of it.
200 % of a number = twice the number.
25 % of a number = $\frac{1}{4}$ of it.
$12\frac{1}{2}$% of a number = $\frac{1}{8}$ of it.
$37\frac{1}{2}$% of a number = $\frac{3}{8}$ of it.
$33\frac{1}{3}$% of a number = $\frac{1}{3}$ of it.

1. Find 200% of $5. Of 3 ft. Of $\frac{1}{2}$ gal.
2. What is 25% of 24 in.? Of 16 ft.? Of 8¢?

3. Find 50% of \$20. Of \$.40. Of a dime. Of a gallon.

4. Find $12\frac{1}{2}\%$ of 40¢. Of 8 yd. Of 4 bu. Of 72 ft.

5. What is $33\frac{1}{3}\%$ of a yard? Of 12 qt? Of \$300?

6. A man who had \$10 spent 50% of it. How much had he left?

7. Mr. Lee has 40 acres of land. If he plants 25% of it in corn, how many acres does he plant?

8. How many days in $33\frac{1}{3}\%$ of the month of June?

9. If \$6 is 50% of my cash, how much have I?

10. 6 is $\frac{1}{5}$ of what number? 6 is 20% of what number?

11. A farmer had 80 chickens, but a hawk caught 25% of them. How many did the farmer have left?

12. What is the difference in hours between $16\frac{2}{3}\%$ and $12\frac{1}{2}\%$ of one day?

13. Eva's age is 75% of the age of Ethel, who is 16 years old. How old is Eva?

14. Pencils bought at 48¢ a dozen were sold at a gain of 25%. Find the selling price of each pencil.

15. A girl spelled correctly 99% of 200 words. How many did she miss?

16. Some boys bought a pie, and each ate 25% of it. If the whole pie was consumed, how many boys were there?

17. What is the distance between two towns if 5 miles is $33\frac{1}{3}\%$ of the distance?

18. I had \$20, but spent \$10 of it for a dress. What per cent of my money did I spend?

19. A farmer who had 8 cows sold 2 of them. What per cent of them did he sell?

20. I bought a stove for \$12 and sold it so as to gain \$3. What per cent of the cost did I gain?

Gain or loss is always some per cent of the cost.

21. A boy bought a watch for \$12 and sold it for \$9. How much did he lose? What per cent of the cost?

22. Robert paid \$15 for an overcoat and sold it for \$20. What per cent did he gain?

23. If I pay \$2 for an article and sell it for \$1, what per cent do I lose?

24. If a sheep is bought for \$4 and sold at a gain of 25%, for how much is it sold?

25. A man paid 50¢ for a knife and sold it at a loss of 10%. What did he get for it?

26. If a grocer buys sugar at 4¢ a pound and sells it at 5¢ a pound, what per cent does he gain?

27. At what price must coffee which cost 15¢ a pound be sold to make a profit of 20%?

28. How much must be paid for a book marked \$2, if 25% is taken off the marked price?

29. If \$12 is $37\frac{1}{2}\%$ of my money, how much have I?

30. An organ which was marked \$70 I bought for 10% less. Tell me what I paid for it.

31. Of a regiment of 1000 soldiers 5% were made prisoners. How many escaped?

32. How much must be paid for a bicycle, if the marked price is \$75, and the *discount*, or the sum taken off, is 40%?

33. What per cent of the day has passed at 6 o'clock A. M.?

34. Oranges were bought at the rate of 2 for 5¢, and sold at 3¢ apiece. What per cent was gained?

35. A man who earned \$60 a month had his salary increased 25%. He then earned \$—— a month.

36. If you get 6 cents *interest* for every 100 cents you loan for a year, what per cent are you getting?

Interest.

375. If a man *borrows* a horse, he does not pay for its use; if he *hires* the horse, he must pay the owner whatever is agreed upon.

When a man borrows money, he is usually required to pay something for its use. Money paid for the use of money is called **Interest.**

1. If you borrow \$100 from me and agree to pay me 6% a year for its use, at the end of the year you must give me back the \$100 and pay me the interest, which is 6% of \$100, or \$ ——.

2. If you borrow \$100 at 4% a year, how much interest will you owe at the end of one year?

3. What is the interest of \$100 for 1 year at 5%?

4. At 6%, what is the interest of \$200 for 1 year? Of \$500? Of \$300?

5. At 4%, what is the interest of \$300 for 1 year? For 2 years?

6. At 3%, what is the interest of \$400 for 1 year? For 2 years?

7. Find the interest of \$300 for 1 year at 5%. For 2 years.

8. At 6%, what is the interest of \$200 for 6 months?

9. At 5%, what is the interest of \$600 for 4 months ($\frac{1}{3}$ yr.)?

10. At 6%, what is the interest of \$200 for 1 year and 6 months ($1\frac{1}{2}$ yr.)?

376. Find the interest of \$200 for—

1. 2 yr. @ 6%
2. 5 yr. @ 6%
3. 6 mo. @ 6%
4. 3 mo. @ 6%
5. 2 mo. @ 6%
6. 9 mo. @ 6%
7. 2 yr. @ 8%
8. 6 yr. @ 8%
9. 3 yr. @ 3%
10. 4 mo. @ 3%
11. 6 mo. @ 4%
12. 9 mo. @ 4%

13. Find the interest of \$150 at 4% for 2 yr. 3 mo.

\$1.50 = interest for 1 yr. at 1%.
4
\$6.00 = interest for 1 yr. at 4%.
2
\$12.00 = interest for 2 yr. at 4%.
1.50 = interest for 3 mo. ($\frac{1}{4}$ yr.) at 4%.
\$13.50 = interest for 2 yr. 3 mo. at 4%.

Find the interest of \$150 for—

14. 3 yr. 4 mo. @ 4%
15. 4 yr. 6 mo. @ 4%
16. 2 yr. 9 mo. @ 4%
17. 5 yr. 2 mo. @ 4%

Find the interest of \$240 for—

18. 1 yr. 3 mo. @ 5%
19. 3 yr. 6 mo. @ 6%
20. 2 yr. 4 mo. @ 4%
21. 4 yr. 8 mo. @ 4%
22. 1 yr. 9 mo. @ 6%
23. 6 yr. 6 mo. @ 3%
24. 8 yr. 4 mo. @ 5%
25. 5 yr. 2 mo. @ 2%
26. 7 yr. 4 mo. @ 8%
27. 1 yr. 1 mo. @ 4%
28. 3 yr. 9 mo. @ 6%
29. 4 yr. 2 mo. @ 5%
30. 10 yr. 4 mo. @ 7%
31. 16 yr. 8 mo. @ 6%

GENERAL REVIEW.

Oral Work.

377. 1. A man bought a book for 56¢ and gave a silver dollar in payment. Count up the change.

2. How many handkerchiefs at 25¢ each can be bought for $3?

3. Find the perimeter of a rectangle 8 ft. long and 50% as wide.

4. If 6 men can build a stable in 8 days, how long would it take one man?

5. If one man can build a wall in 32 days, how long would it take 4 men?

6. If 5 cows are worth 25 sheep, 8 cows are worth —— sheep.

7. How many pounds of butter at 12¢ a pound must be given for 3 lb. of coffee at 16¢ a pound?

8. At the rate of 3 for 5¢, how many oranges can be bought for $1?

9. James bought 3 bushels of pears at $2 a bushel. Henry bought twice as many at the same price. How much did both pay?

10. Lemons were bought at the rate of 2 for 5¢, and sold at 3¢ apiece. Find the gain on a dozen.

11. A grocer paid 75¢ a bushel for potatoes and sold them at 25¢ a peck. How much did he gain on 10 bushels?

12. What is the ratio of a gallon to a pint?

13. A farmer had 40 sheep. Dogs killed one out of every 8. How many were not killed?

14. If 10 men weigh a ton, what is the average weight of each man?

15. How many square inches in a rectangle 8 in. long and 25% as wide?

16. A rectangle 6 ft. long contains 18 sq. ft. What is its width? Draw the figure.

17. What is the perimeter of a square garden containing 25 square rods?

18. A man bought a hat for $2.65. What 4 pieces of money would exactly pay for it?

19. How many 2-inch squares are equal to a 6-inch square?

20. A lady having $20 gave 50% of it to her son and 50% of the remainder to her daughter. How much had she left?

21. If a horse trots 10 miles in an hour, how far does he trot in 6 minutes?

22. A man sold a cow for $\frac{3}{4}$ of her cost. What per cent did he lose?

23. If $50 is $\frac{2}{3}$ of my cash, how much have I?

24. Helen's age is 25% of her father's. If Helen's age is 8 years, what is her father's age?

25. Mr. Jones pays $300 a year for rent, which is 10% of the value of the house. In how many years will his rent amount to the value of the house?

Written Work.

378. **1.** Find the cost of 25 bushels of wheat at $1.15 a bushel.

2. A sheep cost $4, a cow 6 times as much, and a horse 3 times as much as the cow. They all cost $——.

3. A grocer bought a barrel of vinegar containing 42 gallons at 15¢ a gallon. He sold it at 6¢ a quart. How much did he gain?

4. The distance from Pittsburg to Philadelphia is 354 miles. At 2¢ a mile, what is the fare for a round trip?

5. How long is the side of a square whose area is 12½% of that of a rectangle 8 ft. by 16 ft.?

6. A lady bought 8 yd. of silk @ $1.25 a yard, 3 pairs of shoes @ $2.50, 6 lb. of butter @ 15¢, and 1½ pk. of apples @ 20¢ a half peck. Make out the bill.

7. A field is 40 rods long and 16 rods wide. How many square rods does it contain? How many acres?

8. A 2-foot cube of marble was polished at a cost of 25¢ a square foot. How much was paid for polishing?

9. How many square yards of oilcloth will cover a room 18 ft. long and 16 ft. wide?

10. At 12½¢ a yard, what will be the cost of 36 yards of cloth?

11. What number divided by 12 will give the quotient 144?

12. How many boards, each 12 ft. long, will be required for a fence 600 ft. long, and 5 boards high?

13. From a cheese which weighed 75 lb. a grocer cut 42 lb. 8 oz. How much remained?

14. There are 16.5 ft. in a rod. How many feet are there in 320 rods, or 1 mile?

15. How many rails, each 30 ft. long, will be required for a mile of railroad?

16. A fence is 120 ft. long and the posts are 8 ft. apart. Find how many posts there are. Make a drawing.

17. If 2 bushels of oats cost 64¢, what is the cost of 2 pecks?

18. At 12½¢ a quart, how many quarts of molasses will $2 buy?

19. How many eggs, at 10¢ a dozen, can be bought for $2.50?

20. Find two numbers whose product is 105. Two other numbers.

21. In an orchard $\frac{1}{2}$ of the trees are apple, $\frac{1}{3}$ peach, and the remainder pear. There are 10 pear trees. How many peach trees?

22. On Friday a man started on a trip. He was gone 24 days. On what day of the week did he return?

23. A man feeds his horse 6 qt. of oats 3 times a day. How long will 9 bushels of oats last?

24. Does your pulse beat 76 times in a minute? If it does, how many times does it beat in a day?

25. How many pint bottles will it take to hold $9\frac{1}{2}$ gal. of ink?

26. How many cubic feet of water can be put into a trough 6 ft. long, 2 ft. wide, and 1 ft. deep?

27. At $2.40 a square yard, what will it cost to lay a pavement 90 ft. long and 6 ft. wide?

28. Find the interest of $50 for 4 mo. at 6%.

29. I lost $5 by selling a wagon for $35. What per cent did I lose?

30. What is the length and width of your schoolroom? Find the cost of painting the ceiling at 5¢ a square yard.

PRICE-LIST OF TEXT BOOKS.

		Retail price.	Exch'ge price.
1.	Johnson's Primer (in colors), Paper Binding,..	$ 10	$ 05
2.	Johnson's Primer (in colors), Bound in Boards	15	07
3.	Johnsou's First Reader, Bound iu Boards	16	08
4.	Johnson's First Reader, Bound iu Cloth	20	10
5.	Johnson's Second Reader, Bound in Boards	25	12
6.	Johnson's Second Reader, Bound in Cloth	30	15
7.	Johnson's Third Reader, Bound iu Cloth	35	17
8.	Johnson's Fourth Reader, Bound in Cloth	45	22
9.	Johnson's Fifth Reader, Bound in Cloth	60	30
10.	Brausou's Common School Speller, First Book (In Boards)	15	08
11.	Bransou's Common School Speller, Second Book (In Boards)	20	10
12.	Branson's Common School Speller, Complete (In Cloth)	30	15
13.	Lee's New Primary History of the United States (formerly Lee's Primary)	50	25
14.	Lee's New School History of the United States, Cloth	75	35
15.	Lee's New School History of the United States, Half Morocco	85	45
16.	Lee's Advanced School History of the United States	1 00	50
17.	Smithdeal's Slant Writing-Books, (six numbers), each	05	
18.	Johnson's Vertical Writing-Books (Nos. 1, 2, 3, 4), each	04	
	[illegible]'s Vertical Writing-Books (Nos. 5 and 6), each	05	

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52.	Southern Literatnre (from 1579 to 1895)	1 00	
53.	History of Virginia (Maury's)	75	35
54.	Geography of Virginia (Henning's)	25	
55.	Moses' First Phonetic Reader, by Prof. E. P. Moses, Raleigh, N. C. (Other numbers iu course of preparation)	25	
56.	Some Birds and Their Ways, cloth	50	
57.	Grimm's Fairy Tales, by P. P. Claxton and Winifred Haliburton, Cloth	25	

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