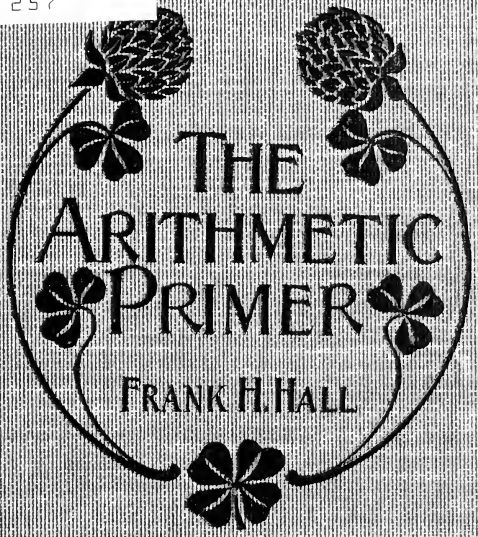

AN · INDEPENDENT · NUMBER BOOK · FOR · BEGINNERS · DESIGNED · TO · PRECEDE · ANY SERIES · OF · ARITHMETICS

THE ARITHMETIC PRIMER

AN INDEPENDENT NUMBER BOOK
DESIGNED TO PRECEDE ANY
SERIES OF ARITHMETICS

BY

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SUGGESTIONS TO TEACHERS AND PARENTS.

CHAPTER I.

NOTE 1.—Most pupils on entering school are somewhat familiar with the number idea. A majority of children at six years of age can separate from a group, four, five, or six objects. Some can count, with a good degree of accuracy, ten or twelve objects. It is therefore unnecessary, except in rare cases, for the teacher of first-grade pupils to spend time in trying to "develop the idea of five" or six. The work suggested in this chapter, then, is, (1) for mothers, (2) for teachers of backward pupils, and (3) for a review of that with which many of the pupils in all first grades are already familiar.

1. Train the child to distinguish one object from two objects.

Bring one apple. Bring two apples. Bring two pencils. Bring one pencil. Hold up one hand. Hold up two hands. Show me one thumb. Show me two thumbs. Give May one cherry. Give John two cherries. Make one mark. Make two marks. How many horses? How many marbles? One apple and one apple are ———. *One book and one book are* ———. *One boy and one boy are* ———.

With two objects in view, the attention of the child being directed to them, say: *One and one are* ——. Repeat many times, using a variety of objects.

With the objects concealed from view, but presumably imaged by the child, say: *One and one are* ——. Repeat many times, taking care that at first there come into the mind of the child images of two certain objects suggested by the words, *One and one.*

NOTE 2.—The *care* suggested in the foregoing is necessary lest the child shall simply memorize the expression, *One and one are two*, without thinking its meaning. The attention of the author was once called to a pupil who was able to recite a hundred number statements like, *Four and four are eight, one half of four is two, four is one half of eight*, and who yet had no knowledge of number whatever—could not select two or three objects from a group. It is a common experience to find pupils in the second and third grades who have memorized number facts without perceiving them.

NOTE 3.—At this stage of the work the child should see number as magnitude. The *one* is to him *one book, one apple, one marble, one boy.* Later he will learn to see number as ratio.

"The formulæ of arithmetic and algebra are capable of double interpretation. For instance, such a symbol as 3 meant, in the first place, a number of letters or men or any other thing; but afterwards was regarded as meaning an operation, namely, that of trebling anything."—*Common Sense of the Exact Sciences,* D. Appleton & Company.

2. Make the child familiar with the number *three;* and with the fact that *two and one are three.* In doing this work, observe the same order as that suggested in the preceding section.

(a) Use objects and name them in connection with the numbers employed; as, *Bring two apples, Bring three apples, Give May two cherries, Give John three cherries, Show me two fingers, Show me three fingers, Two marbles and one marble are three marbles, One book and two books are three books.*

(b) Use objects but do not name them; thus, with two marbles and one marble before the pupil, lead him to say, *Two and one are three, One and two are three.*

(c) Conceal the objects and lead the pupil to image them, and say, *Two and one are three, One and two are three.*

NOTE 4.—To assist the pupil in imaging objects (as two marbles and one marble), these may be exhibited and immediately concealed from view just before the child is required to say, *Two and one are three.* He makes this statement of a number fact and thinks (images) marbles. Later this will not be necessary, for he will early learn the generalization that *two and one are three,* no matter what may be the objects to which these numbers are applied. But he must arrive at this conclusion, not by memorizing the words that express the fact, but by thinking it in connection with a variety of objects.

NOTE 5.—To lead the pupil to think that *two and one are three,* it is not best, at first, to ask how many two and one are. Rather, let the teacher say, *Two and one are* ——, and allow the pupil to complete the statement. This simplifies the work, since it relieves the pupil of the necessity of interpreting a question and framing an answer. It allows him to concentrate his thought upon the number fact. When he is familiar with many number facts he will be able to interpret and to answer questions concerning them. One of the most common errors in arithmetical teaching is the attempt to have a child "express in good English" and in complete sentences that which he does not perceive.

For reasons that will now be apparent, the attention of young pupils may be directed to unfamiliar number facts by means of the incomplete assertion better than by the interrogative sentence.

3. The attention of the child may now be directed to *four* objects. Following the plan outlined on the preceding pages, he should learn that *three and one are four,* that *one and three are four,* that *two and two are four,* and that *two twos are four.*

NOTE 6.—At this stage of the work, the author does not deem it advisable to employ figures or written words to represent number. For some time—many weeks, possibly many months—let the *spoken word* be the only number symbol employed. This will, on the one hand, minimize the danger of leading the pupil into symbol juggling—the use of empty figure symbols; and on the other hand, will avoid the exhaustion of the child's strength (which for the moment we desire to employ in the seeing of magnitude relation and expressing it numerically) in the recognition and pronunciation of written or printed words.

4. The idea of *half* may now be taught.

Give sister half of your candy. Give me half of your apple. Give Henry half of your clay. Continue such work until the child is familiar with the fact that the halves of anything are alike as to quantity.

Give the child four toothpicks. Then say, *Give me half of the toothpicks.* Do the same with two toothpicks; with three toothpicks.

NOTE 7.—If this work is properly performed, little will need to be told the child or done for the child. As soon as he understands what you mean by *half,* he can find half of four toothpicks, half of two, and half of three. Later, he will, without assistance, find half of six, half of five, half of eight, half of seven, half of a foot, half of six inches, half of five inches, half of a half, etc. It is *the idea of half* that is to be taught; then the child should be allowed to *do*—to find half of many things and of many groups of things. He will easily memorize some of the number facts which he perceives; not by remembering the words that express them, but by imaging the related magnitudes. When you say, *Half of four is* ——, he should see with the mind's eye the four (objects) in two equal groups. He then tells you what he sees; namely, that *half of four is two.* It is an *image* that he remembers, not a phrase or sentence.

5. The child may learn to count to ten; or, if this is done with little effort, to twenty, or even to a hundred.

When he is able to take ten objects from a group, he may be allowed to put toothpicks in bunches of ten. These may be held together by little rubber bands. He may learn that *two tens are twenty; three tens, thirty; four tens, forty,* etc. He may do this even before he can count from ten to twenty. He will then be able to tell you that *half of forty is twenty,* and that *half of twenty is ten.*

NOTE 8.—A necessary caution in connection with the foregoing is, that the child should not be allowed to think that saying the names of the numbers in regular order is counting. Neither must he be permitted to entertain the idea, for instance, that the ninth object is *nine;* the tenth object *ten,* etc. He can "count to ten" if he can take from a group of more than ten objects any number of objects not greater than ten that may be suggested. He may be able to bring twenty objects (two tens) or thirty (three tens) or forty (four tens) before he can "count to twenty."

6. Work with the number *five.* Lead the child to discover that *two fives are ten;* that *one half of five is two and one half;* that *four and one are five;* that *three and two are five;* that *two twos and one are five.*

As soon as the child perceives one of the above number facts, he should be encouraged to remember it. This he should do by recalling his image of the objects so grouped as to suggest the fact to be remembered. Thus, the words, *One half of five is* ——, should bring into his consciousness an image of five objects in two equal groups.

NOTE 9.—In Note 4 the use of a variety of objects for the purpose of leading the pupil to abstract the idea of number and to generalize number facts, is recommended. But in teaching a particular number fact, uniformity of objects is preferable to variety. Moreover, the objects employed should be simple and unattractive in themselves. For this early work, nothing can be better than ordinary toothpicks. They are inexpensive, may be broken into halves or thirds or fourths, are easily grouped, and may be conveniently put up in packages of ten.

"The mental comprehension of number is disturbed if things which awaken other ideas or desires are employed. The mind is capable of only a certain amount of interest, and when this interest is wholly or partly withdrawn, but little can be expected for the particular thing at hand. For this reason, while teaching the abstract number there should be but few things shown the child, and these should be simple and uniformly the same."—Levi Seeley, in *Grube's Method of Teaching Arithmetic.*

7. Work with the number *six*. The child should now discover and memorize the following number facts: *Five and one are six. Four and two are six. Three and three are six. Two threes are six. One half of six is three. Three twos are six.*

He may be taught to think of *two* as *one third of six;* and of *four* as *two thirds of six.*

He may learn to count to twelve if he has not already done so; and then he may discover and memorize the fact that *two sixes are twelve.*

8. Teach the figures from 1 to 12. Give the child a foot rule, and help him to become familiar with the terms, *inch* and *foot.*

Teach him to use the rule in measuring. At first let him measure distances that are an integral number of feet or an integral number of inches.

Later, teach him the meaning and use of the expressions, *two and one half feet, two and one half inches, three and one half inches, four and one fourth inches, four and three fourths inches,* etc. Follow this by encouraging him to measure distances suggested by the above expressions.

Help him to discover that *one half is two fourths;* that *one half and one fourth are three fourths;* that *there are four fourths in a whole.*

With the rule concealed from view, ask him to draw a line two inches long; a line three inches long, etc. Then allow him to test his work by applying the rule to the lines he has drawn.

He may be told that *a dozen is twelve.* He may then discover that *half a dozen is six;* that *a fourth of a dozen is three;* that *three fourths of a dozen are nine.*

Note 10.—While doing the above number work, the pupil must not be allowed to lose sight of magnitude. There must be no attempt to have him memorize the words, *one half and one fourth are three fourths.* He must rather discover this number fact and remember it, at first, by recalling his image of the rule and its divisions; or of a pie and its divisions.

Note 11.—The foregoing pages suggest what the average child may easily learn concerning number by the time he is six years of age. It is not expected that the mother will present this to the child in formal number lessons in the exact order here given, but rather that, beginning when the

child is three or four years of age, she will incidentally, in connection with his play or her own work, lead the child to perceive the number facts herein given and to retain them in mind *by means*, chiefly, *of his memory images of the magnitudes considered*.

Besides the mere counting, there are less than fifty of these number facts suggested. One fact learned each week, the work will be accomplished in a year. Some children may learn much more than the amount here suggested; but if all, before entering school, could be introduced to the subject somewhat after the manner herein suggested, the number of pupils thought to be "born short" in respect to mathematical power would be greatly diminished.

NOTE 12.—If the first-grade teacher finds pupils in her class who are seemingly "deficient in the number sense," she should make a careful study of each case; and, using the foregoing pages as suggestive of the order of procedure, should, in connection with the nature work, the drawing, the distribution of material, the paper-folding, etc., help the child to see magnitude relation in a small way, and to express it numerically.

CHAPTER II.

THE FIRST YEAR OF SCHOOL.

NOTE 1.—Soon after the beginning of school the teacher should carefully note the real number knowledge which each pupil possesses. It is not the knowledge and power of the class as a whole that the teacher must discover, but rather the number knowledge of the individual. In making these discoveries the teacher should make use of the suggestions in Chapter I. Pupils who have mastered the work there outlined may safely engage in work suggested by the following topics.

NOTE 2.—The number-work of the first school year should be mainly oral, should occupy comparatively little of the pupil's time, and should be presented incidentally in connection with (1) the administrative duties of the teacher, (2) the nature work, (3) constructive work, and (4) reading.

NOTE 3.—No attempt is made to give these topics in the order in which the work should be presented. Any one of the subjects may be introduced when the pupil seems ready for the little problems given and especially when he feels the need of number knowledge in order that he may perform some task assigned. The thoughtful teacher, however, will always keep in mind the work done by each pupil, and will see that it is frequently reviewed, and that each new step is in some way related to that with which the child is already familiar.

I.—ADMINISTRATION.

1. **Attendance.** How many girls tardy? How many boys tardy? How many pupils tardy? How many girls absent? How many boys absent? How many pupils absent? How many boys present in Row 1? How many girls present in Row 1? How many pupils present in Row 1? How many more pupils present in Row 1 than in Row 2? Which is the larger, Class A or Class B? How many pupils in Class A? How many pupils in Class B? How many pupils absent from Class B? How many pupils present in Class C?

2. **Distribution of Materials.** A monitor from each row goes to the teacher for pencils, sheets of paper, scissors, crayons, or books. How many do you need? Teacher gives some to one of the moni-

tors. How many have you? Do you need as many as you have? Do you have as many as you need? Return to me all you do not need. Monitor goes to the supply and counts for himself under the eye of the teacher. Count by ones. Count by twos. Count by threes. Carry books to Room 2. How many can Mary carry? How many can John carry? How many did Mary carry? How many did John carry? How many more did John carry than Mary?

3. **Time.** Observe the clock face for one minute; for five minutes. Tell the pupils how far the long hand moves in one hour. Observe how far the short hand moves in an hour. Teach the figures on the dial. How far does the long hand move in half an hour? In a quarter of an hour? A quarter of an hour is fifteen minutes. A half hour is thirty minutes. An hour is sixty minutes. Count by fives to fifteen; to thirty; to sixty. Ten is how many fives? Fifteen is how many fives? In five minutes you may have a recess; watch the clock. Observe the position of the hands when school begins; at the beginning of the recess; at the end of the recess; at the close of school; do this for both forenoon and afternoon. Five minutes and one minute are ——. Ten minutes and one minute are ——. Fifteen minutes and one minute are ——. Five minutes and two minutes are ——. Five and three? Five and four? Ten and two? Ten and three? Ten and four? Ten and five? Fifteen and two? Fifteen and three? Fifteen and four? Fifteen and five? John is how many minutes tardy? What time do you start for school? In how many minutes can you come to school? How many hours of school each day? At what time are you dismissed? How many days of school each week? How many days of each week do you remain at home? A week is how many days?

Note 4.—Do not attempt to give all of the foregoing regularly and on consecutive days, before attempting much that follows this topic. Rather, introduce portions of the suggested matter incidentally in connection with and as a part of the administrative work.

But whenever a number fact *that should be memorized* has been given, the teacher should hold it in her own mind for frequent review. So far as possible she should know the memory possessions of *each pupil;* and, taking care that he loses nothing of what he has already acquired, she should see to

it that a little, from time to time, is added thereto. The careless teacher allows a pupil to forget almost as much as he memorizes during a term. This is usually the case with some pupils when the teacher presents the memory work to the class as a whole and loses sight of the individual pupil. The teacher should constantly ask herself: How much more does *Mary* know to-day than she knew yesterday? What does *William* need to review in order that he may be ready for the new number fact? What has *John* perceived and memorized?

II.—NATURE STUDY.

1. **Plants.** Count buds, leaves, petals, etc. Measure growth of twigs. Measure length of needles from pine trees; from spruce trees; from fir trees. Find circumference of trees in school yard. Find growth of corn or of a vine for one day; for one week.

2. **Animals.** Count legs of fly, spider, cray-fish, beetle. How many legs have two toads? Two butterflies? Two spiders? Three cray-fish? Three frogs? Three beetles? How many toes on a cat's fore-foot? On hind-foot? On two fore-feet? On two hind-feet? How many shoes does a horse need? A pair of horses? How many shoes does an ox need? A yoke of oxen? How tall is your pony? (To be measured over the front feet to top of shoulder.) How tall are you?

3. **Weather Record.** Number of clear, cloudy, and rainy days in the week; in the month. Prevailing winds. How many days was there a west wind? An east wind? A north wind? A south wind? A northeast wind? A northwest wind? A southeast wind? A southwest wind? How many days did it rain last month? How many this month? How many more last month than this month? To-day is Monday; last Friday was May sixth; what month and day of the month to-day? Teach pupils to read the thermometer. Represent the thermometer scale on blackboard, one inch equal two degrees. Mark daily readings. Represent five thermometer scales side by side on blackboard. Mark the reading Monday at twelve o'clock on first scale; Tuesday at same hour on second scale, etc. At end of week connect the points of daily marking, thus giving a graphic representation of variation.

Note 5.—The pupils will be interested in noting the variation of the outdoor temperature during a school day. Put eight scales side by side on

blackboard. On the first, mark the standing at nine o'clock; on the second, at ten o'clock, etc. Connect the points of hourly marking. Then ask: At what time was it warmest? How many degrees warmer was it at twelve o'clock than at nine o'clock? At three o'clock than at nine o'clock?

III.—CONSTRUCTIVE WORK.

1. **Drawing.** Draw a horizontal line one inch long; two inches long; three inches long. Draw a vertical line one inch long; three inches long. Draw two parallel horizontal lines three inches long and one inch apart. Draw several parallel vertical lines one half inch apart and two inches long. Draw a four-inch line; bisect it. One half of four inches is ——. Draw a five-inch line; bisect it. One half of five inches is ——. Draw a one-inch square. Draw a two-inch square and divide it into one-inch squares. A two-inch square is equal to —— one-inch squares. Draw a three-inch square; divide it into one-inch squares. A three-inch square is equal to —— one-inch squares. Draw an oblong one inch by three inches; divide it into one-inch squares. Draw an oblong two inches by three inches; divide it into one-inch squares. Divide a one-inch square into half-inch squares. How many half-inch squares in a one-inch square?

Note 6.—In doing the work suggested in the foregoing paragraph at first allow the pupil to use a ruler; then require him to draw without a guide and to test his work with the ruler or with paper of known dimensions.

Note 7.—After the pupil has drawn a figure several times he should be able easily to bring the image of the figure into consciousness when its description is given by the teacher. Thus, when the teacher says, "Imagine a two-inch square; divide it into one-inch squares," the pupil should see all the lines with the mind's eye almost as clearly as they would be seen were the figure on the blackboard in plain view. If he images well he will be able to tell, without drawing, the number of one-inch squares in a two-inch square; the number of two-inch horizontal lines, and the number of two-inch vertical lines, in the figure. Cultivate from the first the imaging power. To answer the question, "A three-inch square equals how many one-inch squares?" by word memory is valueless; to answer by drawing the figure and counting the squares is better; to answer by imaging the figure and counting the squares is best. First-grade pupils can be taught to image such figures.

2. **Paper Folding.** Give to each pupil a four-inch square of paper. How wide is the paper? How long is the paper? How many corners? How many edges?

Fold the right edge upon the left edge. Crease. Unfold. How many oblongs? How wide is each oblong? How long is each oblong? Each oblong is what part of the four-inch square?

Fold the right edge of the paper to the crease; the left edge. Unfold. How many oblongs? How wide is each oblong? How long is each oblong? Each oblong is what part of the four-inch square?

Fold the lower edge upon the upper edge. Unfold. How many oblongs? How wide is each oblong? How long is each oblong? Each oblong is what part of the four-inch square? One half is how many eighths? A fourth is how many eighths? Two fours are ——. Four twos are ——.

Fold the lower edge of the paper to the crease; the upper edge. Unfold. What is the size of each little square? How many one-inch squares in one row? How many rows? How many one-inch squares in all? How many one-inch squares equal a four-inch square? Four fours are ——. One half of sixteen is ——. One fourth of sixteen is ——. Two eights are ——. Four and four and four and four are ——.

Fig. 1.

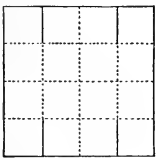


Fig. 2.

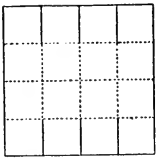
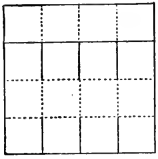


Fig. 3.



Note 8.—By cutting the paper as indicated by the heavy lines in Fig. 1, and folding and pasting the corner squares, an open box two inches by two inches by one inch may be made.

Note 9.—By cutting the paper as indicated by the heavy lines in Fig. 2, and folding and pasting, a square prism one inch by one inch by two inches may be made.

NOTE 10.—By cutting the paper as indicated by the heavy lines in Fig. 3, discarding the four upper squares, and folding and pasting the lower three fourths of the sheet, a one-inch cube may be made.

NOTE 11.—By using an eight-inch square of paper, folding and cutting as indicated by Fig. 1, an open box four inches by four inches by two inches may be made.

NOTE 12.—By using an eight-inch square of paper, folding and cutting as indicated by Fig. 2, a square prism two inches by two inches by four inches may be made.

NOTE 13.—By using an eight-inch square of paper, folding and cutting as indicated by Fig. 3, a two-inch cube may be made.

NOTE 14.—By using a twelve-inch square of paper, folding and cutting as indicated by Fig. 3, a three-inch cube may be made.

3. Building with One-inch Cubes.

NOTE 15.—Provide at least twenty-seven one-inch cubes, a two-inch cube, a three-inch cube, a square prism one inch by one inch by two inches, a square prism one inch by one inch by three inches, a square prism two inches by two inches by three inches, and a rectangular prism one inch by two inches by three inches. These should be made of wood.

A cube has —— faces. Each face of a cube is a square. A cube has —— corners. A cube has —— edges. Three edges meet at each corner.

A square prism has —— faces. Two of the faces are squares. Four of the faces may be oblongs. Some prisms have no square faces.

A face of a two-inch cube is a two-inch square. A two-inch square equals —— one-inch squares.

A face of a three-inch cube is a three-inch square. A three-inch square equals —— one-inch squares.

A two-inch cube equals —— one-inch cubes. A three-inch cube equals —— one-inch cubes.

One half of a two-inch cube equals —— one-inch cubes. One fourth of a two-inch cube equals —— one-inch cubes. One eighth of a two-inch cube equals a —— —— cube.

NOTE 16.—In the beginning the child must work with sense magnitudes; but very early he can be taught to build with, separate into parts, and compare imaged magnitudes. To this end the teacher and pupil must frequently talk about sense magnitudes that are *present to the mind's eye only*. The pupil

must be led to *see* the four sides of a one-inch square, or of a two-inch square; the six square faces of a one-inch cube, or of a two-inch cube; the four one-inch squares in the face of a two-inch cube; the eight one-inch cubes in a two-inch cube; and the twenty-seven one-inch cubes in a three-inch cube, *while all these objects are concealed from view.* At this stage of the work the mathematical skill of the pupil depends mainly upon his ability to call the images of magnitudes into consciousness when the symbols of these (their names or descriptions) are spoken by the teacher.

IV.—READING.

1. **Pages.** Teach the child to find the page by number. How many pages did you read yesterday? Upon what page do you begin to-day? If you read two pages to-day, upon what page will you begin to-morrow? Henry is reading on page 28. Mary is reading on page 32. Mary is how many pages in advance of Henry? How many pages must you read before you reach page 40? How many pages in your book? Twenty pages and twenty pages are —— ——. 30 and 20? 50 and 50? 50 and 20? 29 and 1? 29 and 2? 39 and 1? 39 and 2?

2. **Lines.** Find the first line on the page; the second line; the third line, etc. Read the fourth line. Read the second line. Find the third line on page 21. Find the fourth line from the bottom of the page. How many lines on page 15?

3. **Words.** How many words in the word list at the beginning of lesson? How many words in the first line? In the second line? Find the third word in the second line. Can you find the word *two?* How many times does the word *two* occur on page 10?

4. **Letters.** How many letters in the word *John?* In the word *apple?* Find the longest word on page 10. How many letters in the longest word on page 12? How many words can you think of, each of which is made of two letters? Of three letters? Of four letters?

NOTE 17.—*The Pedagogical Pause.* We have grammatical pauses and rhetorical pauses. There is yet another pause that may very properly be called *the pause pedagogical.* It is the pause that the teacher should make as a pedagogical necessity in questions and statements to pupils. This pause should follow a word or phrase which symbolizes something that may be difficult for the hearer to image. The length of the pause should be measured

by the time required by the pupil to image that for which the word or phrase stands. This pause is indicated in the following sentences by the double asterisk:

The written word *boy* * * contains how many letters?

One half of a foot * * is how many inches?

How many *half inches* * * in three inches?

One half of *four toothpicks* * * is —— ——.

One half of *three toothpicks* * * is —— ——.

Think of a *two-inch square* * * Divide it into *one-inch squares* * * How many one-inch squares?

How many *one-inch squares of paper* * * do you need to make a three-inch square?

How many *one-inch cubes* * * do you need to build a two-inch cube?

A *four-inch cube* * * equals how many two-inch cubes?

A *four-inch square* * * equals how many two-inch squares?

A *two-inch cube* * * equals how many one-inch cubes?

A *two-inch square* * * equals how many one-inch squares?

With the bright pupil this pause may be made very short. With the dull pupil it should be made very, very long. With any pupil it must be made long enough for him to image that for which the *word symbols* stand. To proceed without the imaging on the part of the pupil, is to tempt him into word memory work. A proper observance of this pause and special attention to the imaging power of individual pupils can not fail to promote better teaching in elementary number-work.

Note 18.—It will be observed that the child has already reached a point at which a kind of double imaging is necessary. The teacher may speak the word "cube" when she desires to bring into the consciousness of the child an image of the written word *cube*. Again, she may speak the word "cube" and desire to bring into the consciousness of the child an image of that for which the written word stands. The teacher must now strive to see into the child mind and to note the character of the imaging that is being done. If the child images the *word* cube when the teacher expects him to image that for which the word stands—the real cube—and if the teacher proceeds on the supposition that the child is imaging the *one* when he is really imaging the *other*, the results must be unsatisfactory and often positively harmful to the pupil. The most practical and profitable child-study is that which enables the teacher to read the child mind, and to note correctly the kind and amount of imaging activity. The difficult thing in the early work in mathematics is not, *to see relation*, but *to bring into consciousness images of the things related.*

CHAPTER III.

THE SECOND YEAR OF SCHOOL.

The number-work of the second school year must be done mainly orally. A book must not be put into the hands of the second grade pupil *for the purpose of teaching him number facts.* If a number book is used at all in this grade, it should be made up of *reading lessons* in which the child simply reviews number facts with which he is already familiar. A well-arranged book used as here suggested will not only review number facts, but will furnish reading matter in which the pupil will be greatly interested.

THE PRIMER OF ARITHMETIC is especially designed to show the order in which the number facts may be presented orally, and to furnish reading lessons in which the pupil will be led to review these facts.

The teacher should take great care to prepare the pupil, by oral instruction, for the page he is to read. The oral work should always be considerably in advance of the reading lesson. In fact, the second-grade pupil should not be asked to read statements expressing number knowledge until he thoroughly understands the numerical relations involved. When he reads, his task should be to recognize through the eye and to express that with which his ear is quite familiar. A good book used in the second grade for this purpose will be helpful; used (in the hands of the pupils) to teach number facts, it will be *positively harmful.*

If the lessons herein suggested for the home and for the first school year are properly taught, but little time will be required to master the lessons suggested for the second school year. No formal number-work at all, in the first two years of school, is better than too much work, or work improperly done. Too much number work will give to the pupil a bias, on account of which magnitude relation will, ever after, occupy too prominent a place in his thought. Num-

ber-work improperly done will create a distaste for such effort, and result in arrested development and possible permanent injury to the pupil.

"It is perhaps not too much to say that nine tenths of those who dislike arithmetic, or who at least feel that they have no aptitude for mathematics, owe this misfortune to wrong teaching at first."—McLellan and Dewey, in *Psychology of Number*, page 146.

"There is no subject taught in the elementary schools that taxes the teacher's resources as to methods and devices to a greater extent than arithmetic. There is no subject taught that is more dangerous to the pupil in the way of deadening his mind and arresting its development, if bad methods are used."—Dr. Wm. T. Harris, in Editor's Preface to *Psychology of Number*, D. Appleton & Co.

THE PLAN OF THE BOOK.

The Primer of Arithmetic is not made up mainly of graded miscellaneous problems. It is built on a plan. Each four-page group constitutes the larger unit of the plan. Twenty-seven presentations of this gradually changing unit make up the book.

In the first eleven groups (44 pages) the page units are as follows:

1st page—New number facts.

2d page—Number facts applied to linear measurements.

3d page—Number facts applied to surface measurements.

4th page—The "Elementary Spiral" (a problem in each of the five fundamental processes), followed by miscellaneous problems.

In the remainder of the book, the 1st and 4th pages of each group are similar to the corresponding pages of the first eleven groups. The 2d page teaches the application of primary facts to larger numbers. The 3d page deals with solid, surface, linear, and capacity measurements.

The teacher and pupil soon discover that the mastery of the first page of a group (and all preceding it) makes the work of the other three pages easy and interesting. The child quickly learns that it is necessary that certain number facts should be memorized. The teacher knows exactly where to find these facts, and is given definite direction in regard to the order in which they should be presented.

The last three pages of each group, particularly in the first 44 pages, furnish at once a review of the newly learned number facts,

and a reward for doing the work presented on the 1st page of each group.

It will be observed that the plan of the book is such that each page, between pages 4 and 100, sustains a kind of double (or quadruple) relation to other parts of the book. It is, of course, related to the page preceding it and to the page following it. It is also closely related to the 4th page before it and to the 4th page after it. Compare page 23 with pages 19 and 27; page 30 with pages 26 and 34; page 62 with pages 58 and 66; page 52 with pages 48 and 56. Such an arrangement as this greatly aids in giving to the child a lively sense of the relation of the new to the old. Moreover, it does not allow him to forget the fundamental number facts that are so essential to his progress.

The one direction to the teacher, more important than all others, and hence here repeated, is:

By means of oral instruction, teach thoroughly every fact given in a 4-page group, before asking or allowing the pupil to attempt to read any page of the group.

The reading thus becomes a pleasant review (a seeing again), by means of *printed language*, of that with which the child is already familiar when presented to him in *spoken language*.

It is the hope of the author that this little book will help to diminish, rather than increase, the amount of time devoted to number-work in the first two grades of the school. If the work is properly done, but little time will be required in its performance.

Mere "figure processes" are designedly omitted from most of the pages of the book. The child should be well grounded in elementary number processes before he begins to practice figure manipulation. Such *number* work furnishes the only proper basis for the *figure* work that will follow.

To teachers who may find difficulty in supplying profitable "seat-work" for their pupils, and who have heretofore kept them busy with long figure-problems, the following is suggested:

In place of mere figure work, require the pupils to copy certain pages from this book, carefully filling all the blanks. Select pages

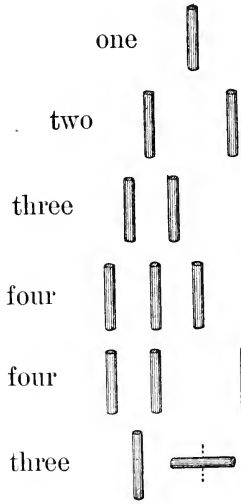
with which the child is quite familiar, and put the main emphasis upon *accuracy*. Make the lesson simple enough, and so impress the pupils with the importance of *absolute accuracy* that at least 75% of all the papers (or slates) examined will be free from errors—in spelling, in use of capital letters, in punctuation, or in figures. Commend only those who have "perfect papers"—perfect in respect to the four points named above.

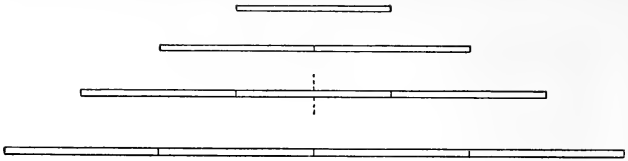
The educative value of such an exercise as this is not to be compared with mere figure manipulation in which "90% of accuracy" is accounted *good*, 80% *fair*, and 70% good enough to "*pass*." Let the pupils early learn that in arithmetic, at least, nothing short of almost perfect accuracy is *of any value whatever*. Measure the pupils in all the grades, not so much by the ratio of the number of accurate answers to the number of problems given, but rather by *the amount of work they are able to do without making any errors*. Allow no pupil to leave any grade of the school with the impression that in number-work "90% of accuracy" is *good*.

F. H. H.

Jacksonville, Ill., Jan. 1, 1901.

THE PRIMER OF ARITHMETIC.





inch inches

1 and 1 are ——.
2 and 1 are ——.
2 and 2 are ——.
3 and 1 are ——.

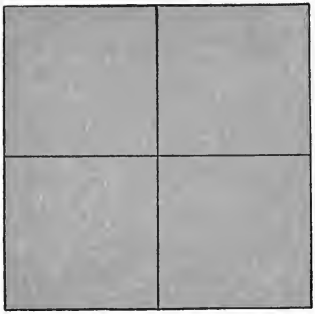
2 inches and 1 inch are —— inches.
2 inches and 2 inches are —— inches.
4 inches less 1 inch are —— inches.
4 inches less 2 inches are —— inches.
3 inches less 1 inch are —— inches.

1. One half of 4 inches is —— inches.
2. One half of 3 inches is ——.
3. One half of 2 inches is —— inch.
4. John had a pencil exactly 4 inches long. He broke it into two equal pieces. Each piece was —— inches long.

A 1-inch square.

1 in. by 1 in.

A 2-inch square.



2 inches by 2 inches.

1. A square has —— corners.

2. A square has —— square corners.

3. A square has —— equal sides.

4. The red square is a —— square.

5. The yellow square is a —— square.

6. The yellow square is —— times as large as the red square.

7. The red square is —— —— as large as the yellow square.

8. A 2-inch square equals —— 1-inch squares.

9. A 1-inch square equals what part of a 2-inch square?

10. Two 1-inch squares equal what part of a 2-inch square?

1. John had 3 cents. His father gave him 1 cent more. He then had —— cents.

2. Mary had 3 cents. She spent 1 cent. She then had —— cents.

3. At 2 cents each, two lemons cost —— cents.

2 times 2 cents are —— cents.

4. How many 2-cent stamps can you buy with 4 cents?

5. One half of 4 cents is —— cents.

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6. One half of 4 apples is —— apples.

7. One half of 3 apples is ————.

8. One half of 2 apples is —— apple.

9. Two apples are 1 half of —— apples.

10. One apple is 1 half of —— apples.

11. One and one half apples are one half of —— apples.

12. Henry sold apples at the rate of 2 apples for 1 cent. For 4 apples he should receive —— cents.

3 and 1 =	4 less 2 =
2 and 1 =	4 less 3 =
2 and 2 =	4 less 1 =

five  5

five  5

five  5

4 and 1 are ——.

3 and —— are 5.

5 less 1 = 5 less 4 =

5 less 2 = 5 less 3 =

1 half of 5 is ————.

2 twos and 1 are ——.

2 books and 2 books are —— books.

3 boys and 2 boys are —— boys.

2 men and 1 man are —— men.

1 girl and 4 girls are —— girls.

2 apples and 2 apples are —— apples.

4 marbles and 1 marble are —— marbles.

4 inches and 1 inch =
5 inches less 2 inches =
3 inches less 2 inches =
2 inches and 3 inches =
5 inches less 3 inches =
3 inches and 2 inches =
5 inches less 1 inch =

---

1. One half of 5 inches is ————.

2. Two inches are 1 half of —— inches.

3. One and 1 half inches are 1 half of —— inches.

4. Two and 1 half inches are 1 half of —— inches.

5. One inch is 1 half of —— inches.

6. In 1 inch there are —— half-inches.

7. In 2 inches there are —— half-inches.

8. In 2 and 1 half inches there are —— half-inches.

9. Henry had a pencil exactly 5 inches long. He broke it into two equal pieces. Each piece was ———— inches long.

An oblong.

1 in. by 2 in.

An oblong.

1 in. by 3 in.

An oblong.

1 in. by 5 in.

1. An oblong has —— corners.

2. An oblong has —— sides.

3. Two of the sides of an oblong are longer than the other two sides.

4. The red oblong is —— inch wide and —— inches long.

5. The yellow oblong is —— inch wide and —— inches long.

6. How long is the blue oblong?

1. Henry had 3 cents. He earned 2 cents more. He then had —— cents.

2. Helen had 5 cents. She spent 3 cents. She then had —— cents.

3. At 1 cent each, 5 apples cost —— cents. 5 times 1 cent are —— cents.

4. How many 2-cent stamps can you buy with 5 cents?

5. One half of 5 pies is ——— pies.

---

6. An oblong 1 inch wide and 5 inches long is equal to —— 1-inch squares.

7. An oblong 1 inch by 5 inches is —— times as large as a 1-inch square.

8. Cut from paper a 2-inch square.

(a) Place it upon your desk with one edge parallel with the front edge of your desk.

(b) Fold the front edge upon the back edge. Crease. Unfold.

(c) Fold the right edge upon the left edge. Crease. Unfold.

(d) A 2-inch square is equal to —— 1-inch squares.

six  6

six  6

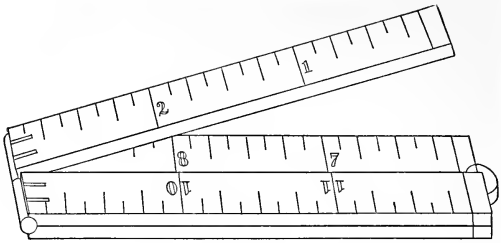
six  6

5 and 1 are ——.
4 and —— are 6.
3 and —— are 6.

6 less 5 = 6 less 2 =
6 less 4 = 6 less 3 =

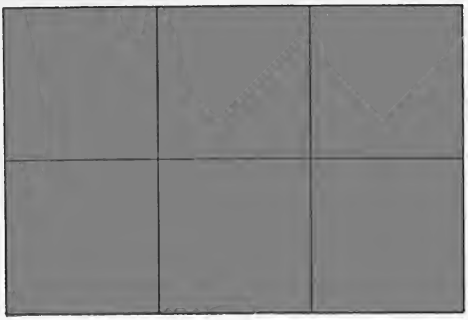
4 books and 2 books are —— books.
2 hats and 3 hats are —— hats.
3 cows and 3 cows are —— cows.
5 birds and 1 bird are —— birds.
2 flags and 3 flags are —— flags.
4 sleds and 2 sleds are —— sleds.

3 twos =  2 threes =



3 inches and 3 inches =
6 inches less 3 inches =
4 inches and 2 inches =
6 inches less 2 inches =
5 inches and 1 inch =

1. A foot is twelve inches.
2. One half of a foot is —— inches.
3. One half of six inches is —— inches.
4. Six inches are one half of —— ——.
5. Three inches are one half of —— ——.
6. In three inches there are —— half-inches.
7. My pencil is about —— inches long.
8. My slate is about —— inches wide.
9. Draw a horizontal line 3 inches long.
10. Draw a vertical line 3 inches long.



1. The red oblong is —— inches wide.

2. The red oblong is —— inches long.

3. An oblong two inches wide and 3 inches long is equal to —— 1-inch squares.

4. Two threes are ——. Three twos are ——.

5. An oblong 1 inch wide and 6 inches long is equal to —— 1-inch squares.

6. The red oblong is how many 1-inch squares larger than a 2-inch square?

7. The red oblong is how many times as large as a 1-inch square?

8. One half of the red oblong equals how many 1-inch squares?

1. James had 4 arrows. He made 2 more. He then had —— arrows.

2. Richard had 6 arrows. He lost 4 of them. He then had —— arrows.

3. At 2 cents each, 3 oranges cost —— cents. 3 times 2 cents are —— cents.

4. How many 2-cent stamps can you buy with 6 cents? 2 cents are contained in 6 cents —— times.

5. One half of 6 days is —— days.

---

6. Cut from paper an oblong 2 inches by 3 inches. Cut from paper a 2-inch square. The oblong is ———— times as large as the square.

7. Cut from paper 6 1-inch squares.

(a) Arrange these into an oblong 1 inch by 6 inches.

(b) Arrange them into an oblong 2 inches by 3 inches.

(c) Make with them a 2-inch square. What part of a 2-inch square can you make with what remain?

8. Two 1-inch squares are —— —— of a 2-inch square.

seven  7

seven  7

seven  7

seven  7

6 and 1 are ——.

5 and —— are 7.

4 and —— are 7.

7 less 1 = 7 less 6 =

7 less 2 = 7 less 5 =

7 less 3 = 7 less 4 =

1 half of 7 is ————.

5 pins and 2 pins are —— pins.

4 caps and 2 caps are —— caps.

4 hens and 3 hens are —— hens.

3 eggs and 3 eggs are —— eggs.

4 inches and 3 inches =
7 inches less 3 inches =
5 inches and 2 inches =
7 inches less 2 inches =
4 inches and 3 inches =
7 inches less 4 inches =
6 inches and 1 inch =
7 inches less 1 inch =

1. One half of a foot and 1 inch are —— inches.

2. One half of a foot less 1 inch equals —— inches.

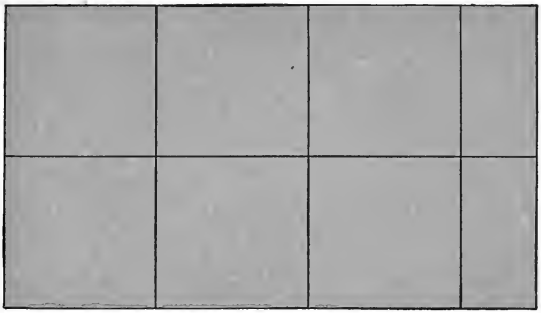
3. One half of 7 inches is ———— inches.

4. In three and 1 half inches there are —— half-inches.

5. Three and 1 half inches are 1 half of —— inches.

6. Draw a horizontal line 6 inches long. Without measuring, divide it into two equal parts. Each part should be —— inches long.

7. Draw a horizontal line 5 inches long. Without measuring, divide it into two equal parts. Each part should be ———— inches long.



1. The yellow oblong is —— inches wide and ———— inches long. It contains —— 1-inch squares and 2 halves of a 1-inch square. We say that it contains **7 square inches**; that is, it is 7 times as large as a 1-inch square.

2. An oblong 2 inches by 3 inches contains —— square inches.

3. A 2-inch square contains —— square inches.

4. Think of an oblong 2 inches wide and 2 and 1 half inches long. How many square inches does it contain?

5. Two times 3 and 1 half are ——.

6. Two times 2 and 1 half are ——.

1. Mr. Smith had 4 cows. He bought 3 more. He then had —— cows.

2. Mr. Harris had 7 cows. He sold 2 of them. He then had —— cows.

3. At 2 dollars each, 3 sheep cost —— dollars. 3 times 2 dollars are —— dollars.

4. How many 2-cent stamps can you buy with 7 cents?

5. One half of 7 dollars is ——— dollars.

---

6. An oblong 1 inch by 7 inches contains —— square inches; that is, it is —— times as large as a 1-inch square.

---

7. In a week there are —— days.

8. The first day of the week is ——.

9. The 7th day of the week is ——.

10. The second day of the week is ——.

11. George goes to school 5 days of each week, and is at home the other days of the week. He is at home —— days. In 2 weeks he is in school —— days.

eight  8

eight  8

eight  8

eight  8

7 and 1 are ——.

6 and —— are 8.

5 and —— are 8.

4 and —— are 8.

8 less 4 are ——.

8 less 1 = 8 less 7 =

8 less 2 = 8 less 6 =

8 less 3 = 8 less 5 =

1 half of 8 is ——.

5 cents and 3 cents are —— cents.

4 days and 3 days are —— days.

6 nails and 2 nails are —— nails.

4 twos =  2 fours =

4 inches and 4 inches =
8 inches less 4 inches =
5 inches and 3 inches =
8 inches less 3 inches =
6 inches and 2 inches =
8 inches less 2 inches =
8 inches less 6 inches =

1. One half of a foot and 2 inches are —— inches.

2. One half of a foot less 2 inches equals —— inches.

3. One half of 8 inches is —— inches.

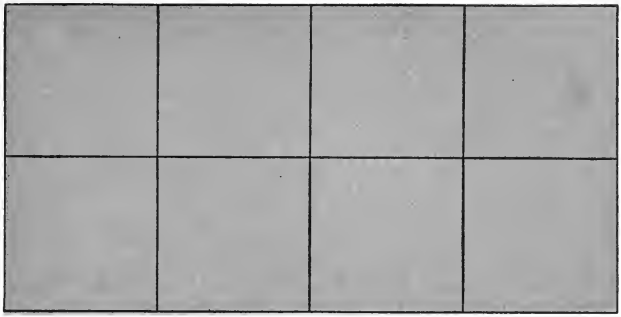
4. In 4 inches there are —— half-inches.

5. Four inches are 1 half of —— inches.

6. Draw a horizontal line 7 inches long. Without measuring, divide it into two equal parts. Each part should be ———— inches long.

7. Draw a horizontal line 8 inches long. Without measuring, divide it into two equal parts. Each part should be —— inches long.

8. Draw a vertical line 4 inches long. Without measuring, divide it into two equal parts. Each part should be —— inches long.



1. The green oblong is —— inches wide and —— inches long. In it there are —— 1-inch squares.

2. An oblong 2 inches by 4 inches contains —— square inches; that is, it is —— times as large as a 1-inch square.

3. Two times 4 are ——.

4. Four times 2 are ——.

5. Three times 2 are ——.

6. Two times 2 are ——.

7. Two times 2 cents are —— cents.

8. Three times 2 cents are —— cents.

9. Four times 2 cents are —— cents.

10. Two times 3 cents are —— cents.

1. Mrs. Smith had 5 boxes of berries. She picked 3 boxes more. She then had —— boxes.

2. Mrs. Harris had 8 boxes of berries. She sold 6 boxes. She then had —— boxes.

3. Mary gets 2 cents a box for picking berries. For picking 4 boxes she gets —— cents. 4 times 2 cents are —— cents.

4. How many 2-cent stamps can you buy for 8 cents? 2 cents are contained in 8 cents —— times.

5. One half of 8 boxes of berries is —— boxes of berries.

---

6. An oblong 1 inch by 8 inches contains —— square inches; that is, it is —— times as large as a 1-inch square.

---

7. Cut from paper an oblong 2 inches by 4 inches.

(a) Place it on your desk with the long edge parallel with the front edge of your desk.

(b) Fold the right edge upon the left edge. Crease. Unfold.

(c) *Observe*, that an oblong 2 inches by 4 inches is equal to two ———— squares.

nine  9

nine  9

nine  9

nine  9

8 and 1 are ——.

7 and —— are 9.

6 and —— are 9.

5 and —— are 9.

9 less 2 = 9 less 7 =

9 less 3 = 9 less 6 =

9 less 4 = 9 less 5 =

1 half of 9 is ————.

3 threes =  1 third of 9 =

5 inches and 4 inches =
9 inches less 4 inches =
6 inches and 3 inches =
6 inches less 3 inches =
7 inches and 2 inches =
7 inches less 2 inches =

1. One half of a foot and 3 inches are —— inches.

2. One half of a foot less 3 inches equals —— inches.

3. One half of 9 inches is ———— inches.

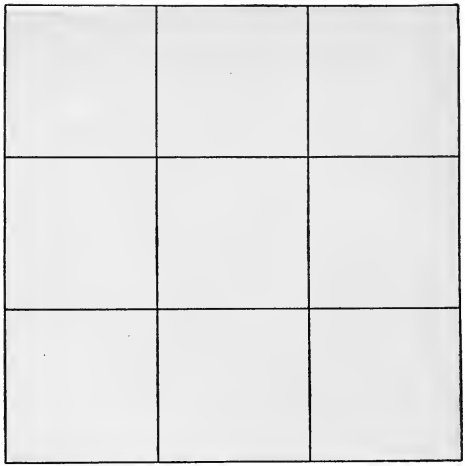
4. One third of 9 inches is —— inches.

5. Two thirds of 9 inches are —— inches.

6. Draw a horizontal line 9 inches long. Divide it into two equal parts. Each part should be ———— inches long.

7. Draw a horizontal line 9 inches long. Divide it into three equal parts. Each part should be —— inches long.

8. Draw a vertical line 6 inches long. Divide it into three equal parts. Each part should be —— inches long.



1. The blue figure is a —— square. In it there are —— 1-inch squares.

2. A 3-inch square contains —— square inches; that is, it is —— times as large as a 1-inch square.

3. Three times 2 are ——.

4. Three times 3 are ——.

5. Two times 3 marks are —— marks.

6. Three times 3 marks are —— marks.

7. Two times 4 marks are —— marks.

8. Four times 2 marks are —— marks.

1. Jane paid 5 cents for a tablet and 4 cents for a pencil. For both she paid —— cents.

2. Lily is 9 years old and her sister is 6 years old. Lily is —— years older than her sister.

3. At 3 cents each, 2 oranges cost —— cents; 3 oranges cost —— cents.

2 times 3 cents are —— cents.

3 times 3 cents are —— cents.

4. How many 3-cent stamps can you buy for 9 cents? 3 cents are contained in 9 cents —— times.

5. One third of 9 days is —— days.

6. Two thirds of 9 days are —— days.

---

7. Look at the figure on page 19. If this figure were 1 inch longer than it is, it would contain —— square inches. An oblong 2 inches by 4 and 1 half inches contains —— square inches.

$4\frac{1}{2}$ and $4\frac{1}{2}$ are ——.

2 times $4\frac{1}{2}$ are ——.

$3\frac{1}{2}$ and $3\frac{1}{2}$ are ——.

2 times $3\frac{1}{2}$ are ——.

2 times $2\frac{1}{2}$ are ——.

ten  10

ten  10

ten  10

ten  10

ten  10

9 and 1 are ——.

8 and —— are 10.

7 and —— are 10.

6 and —— are 10.

5 and —— are 10.

10 less 2 = 10 less 8 =

10 less 3 = 10 less 7 =

10 less 6 = 10 less 4 =

ten  10

G-1

5 inches and 5 inches =
10 inches less 5 inches =
6 inches and 4 inches =
6 inches less 4 inches =
7 inches and 3 inches =
7 inches less 3 inches =

1. One half of a foot and 4 inches are —— inches.

2. One half of a foot less 4 inches equals —— inches.

3. One half of 10 inches is —— inches.

4. In 5 inches there are —— half-inches.

5. Five inches are 1 half of —— inches.

---

6. { One half of 4 inches is —— inches.
   { Four inches are 1 half of —— inches.

7. { One half of 3 inches is ————.
   { Three inches are 1 half of —— inches.

8. { One half of 2 inches is —— inch.
   { Two inches are 1 half of —— inches.

9. { One half of 5 inches is ————.
   { Five inches are 1 half of —— inches.

1. The yellow figure is an oblong. It is —— inches wide and —— inches long. In it are —— 1-inch squares.

2. An oblong 2 inches by 5 inches contains —— square inches; that is, it is —— times as large as a 1-inch square.

3. Two times five 1-inch squares are —— 1-inch squares.

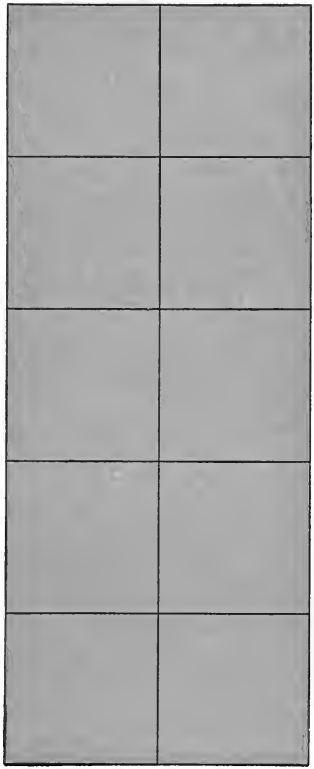
4. Five times two 1-inch squares are —— 1-inch squares.

5. Two times five books are —— books.

6. Five times two books are —— books.

7. Two times 5 =

8. Five times 2 =



1. Alice is 8 years old. In two years more she will be —— years old.

2. Susie is 10 years old. She began to go to school 4 years ago. Then she was —— years old.

3. At 5 cents each, 2 pencils cost —— cents.

2 times 5 cents are —— cents.

4. How many 2-cent stamps can you buy for 10 cents? 2 cents are contained in 10 cents —— times.

5. One third of 9 years is —— years.

---

6. { One third of 3 inches is —— inch.
Three inches are 1 third of —— inches.

---

7. Look at the figure on page 19. If this figure were 1 inch shorter than it is, it would contain —— square inches. An oblong 2 inches by $2\frac{1}{2}$ inches contains —— square inches. $2\frac{1}{2}$ and $2\frac{1}{2}$ are ——.

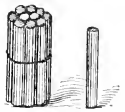
2 times $2\frac{1}{2}$ are ——.

2 times $3\frac{1}{2}$ are ——.

2 times $1\frac{1}{2}$ are ——.

$2\frac{1}{2}$ and $2\frac{1}{2}$ and $2\frac{1}{2}$ =

3 times $2\frac{1}{2}$ are ——.

eleven  11

10 and 1 are ——.
9 and —— are 11.
8 and —— are 11.
7 and —— are 11.
6 and —— are 11.

11 less 1 =	11 less 10 =
11 less 2 =	11 less 9 =
11 less 3 =	11 less 8 =
11 less 4 =	11 less 7 =
11 less 5 =	11 less 6 =

One half of 11 is ————.

---

8 chairs and 3 chairs are —— chairs.
5 chairs and 4 chairs are —— chairs.
7 chairs and 4 chairs are —— chairs.

4 flags and 6 flags are —— flags.
6 flags and 5 flags are —— flags.
8 flags and 2 flags are —— flags.

6 inches and 5 inches =
11 inches less 6 inches =
7 inches and 4 inches =
7 inches less 4 inches =
8 inches and 3 inches =
8 inches less 3 inches =

1. One half of a foot and 5 inches are —— inches.

2. One half of a foot less 5 inches equals —— inch.

3. One half of 11 inches is —— inches.

4. In $5\frac{1}{2}$ inches there are —— half-inches.

5. Five and 1 half inches are 1 half of —— inches.

---

6. My book is about —— inches wide.

7. My book is about —— inches long.

8. My pencil is about —— inches long.

---

9. Draw two parallel vertical lines one half-inch apart and 4 inches long.

10. Draw two parallel horizontal lines one half-inch apart and 4 inches long.

1. An oblong 2 inches wide and $5\frac{1}{2}$ inches long contains —— square inches.

$5\frac{1}{2}$ and $5\frac{1}{2}$ are ——.

Two times $5\frac{1}{2}$ are ——.

2. Which is the larger, a 3-inch square or an oblong 2 inches by 5 inches?

The square contains —— square inches.

The oblong contains —— square inches.

3. Which is the larger, a 2-inch square or an oblong 1 inch by 5 inches?

The square contains —— square inches.

The oblong contains —— square inches.

4. How many square inches in an oblong that is half a foot long and 1 inch wide?

5. I am thinking of an oblong that is 2 inches wide. It contains 6 square inches. How long is it?

2 times —— are 6.

6. I am thinking of an oblong that is 2 inches wide. It contains 8 square inches. How long is it?

2 times —— are 8.

2 times —— are 5.

2 times —— are 7.

1. Jason rode on his wheel 6 miles Monday and 5 miles Tuesday. In all he rode —— miles.

2. Little Joe started in the morning to ride to his uncle's home, 11 miles away. By noon he had ridden 7 miles. He had —— miles farther to go.

3. Bennie can easily ride his wheel at the rate of 5 miles an hour. In 2 hours he can ride —— miles.

2 times 5 miles are —— miles.

4. How many 5-cent stamps can you buy with 11 cents?

5. One third of 9 miles is —— miles.

---

6. There are 5 school days in a week. In two weeks there are —— school days.

7. Frank had 6 cents and his brother had half as many. Together they had —— cents.

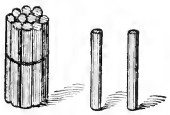
8. Two yards of ribbon at 4 cents a yard will cost —— cents.

9. A nickel is —— cents.

10. A dime is —— cents.

11. A nickel and a dime are —— cents.

12. A "quarter" is —— cents.

twelve  12

11 and 1 are ——.
10 and —— are 12.
9 and —— are 12.
8 and —— are 12.
7 and —— are 12.

12 less 2 = 12 less 10 =
12 less 3 = 12 less 9 =
12 less 4 = 12 less 8 =
12 less 5 = 12 less 7 =
12 less 6 = 2 sixes =

One half of 12 is — —.

---

9 books and 3 books are —— books.
8 books and 2 books are —— books.
7 books and 5 books are —— books.

5 girls and 6 girls are —— girls.
4 girls and 8 girls are —— girls.
3 girls and 7 girls are —— girls.

6 inches and 6 inches =

12 inches are 1 ——.

1 foot less 5 inches =

1 foot less 4 inches =

7 inches and 5 inches =

1 foot less 3 inches =

8 inches and 4 inches =

3 inches are 1 fourth of a foot.

6 inches are —— —— of a foot.

9 inches are —— —— of a foot.

$\frac{1}{4}$ of a foot and 1 inch are —— inches.

$\frac{1}{2}$ of a foot and 1 inch are —— inches.

$\frac{3}{4}$ of a foot and 1 inch are —— inches.

$\frac{3}{4}$ of a foot less 1 inch are —— inches.

---

1. Draw on the blackboard two parallel horizontal lines 1 foot long and 2 inches apart.

2. Draw a 1-foot square. Draw a 2-foot square. The 2-foot square is how many times as large as the 1-foot square?

3. Draw an oblong 1 foot wide and 3 feet long. The oblong is equal to —— 1-foot squares.

1. An oblong 2 inches wide and 6 inches long contains —— square inches.

6 and 6 are ——.

Two times 6 are ——.

Six times 2 are ——.

2. Which is the larger, a 2-foot square or an oblong that is 1 foot by 5 feet?

The square contains —— square feet.

The oblong contains —— square feet.

3. Which is the larger, a 3-foot square or an oblong 2 feet by 5 feet?

The square contains —— square feet.

The oblong contains —— square feet.

4. How many square inches in an oblong that is half a foot long and 2 inches wide?

5. I am thinking of an oblong that is 2 inches wide. It contains 10 square inches. How long is it?

2 times —— are 10.

6. I am thinking of an oblong that is 2 inches wide. It contains 12 square inches. How long is it?

2 times —— are 12.

6 times —— are 12.

1. Herbert worked 7 hours Monday and 5 hours Tuesday. In both days he worked —— hours.

2. Mr. Jones works 12 hours each day. His son works 8 hours. The father works —— hours more than the son.

3. Alfred worked 2 hours a day for all the working days of a week. In all he worked —— hours.

6 times 2 hours are —— hours.

4. Wilbur can cane a chair in 2 hours. In 10 hours he can cane —— chairs.

2 hours are contained in 10 hours —— times.

5. One third of 6 hours is —— hours.

---

6. There are 6 working days in a week. In 2 weeks there are —— working days.

7. Peter had 8 cents and his brother had half as many. Together they had —— cents.

8. Two yards of ribbon at 6 cents a yard will cost —— cents.

9. A year is 12 months.

One fourth of a year is —— months.

Three fourths of a year are —— months.

3 fours = 4 threes =

2 fours = 3 threes =

1. Four times 3 stars are —— stars.
2. Three times 4 stars are —— stars.
3. One third of 12 stars is —— stars.
4. Two thirds of 12 stars are —— stars.
5. Four stars are —— —— of 12 stars.
6. Six stars are —— —— of 12 stars.
7. Three stars are —— —— of 12 stars.

---

9 stars and 3 stars are —— stars.

8 stars and 4 stars are —— stars.

12 stars less 3 stars are —— stars.

12 stars less 4 stars are —— stars.

6 stars and 6 stars are —— stars.

12 stars less 5 stars are —— stars.

12 stars less 2 stars are —— stars.

12 stars less 6 stars are —— stars.

1. Draw a line on the blackboard 3 feet long.

Three feet are 1 *yard.*

2. Draw a line on the blackboard 2 yards long.

Two yards are —— feet.

3. Measure off three yards of string.

Three yards are —— feet.

4. Measure off four yards of string.

Four yards are —— feet.

5. One yard is —— feet. One half of a yard is ———— feet.

6. One third of a yard is —— foot.

7. Two thirds of a yard are —— feet.

8. One and 1 third yards are —— feet.

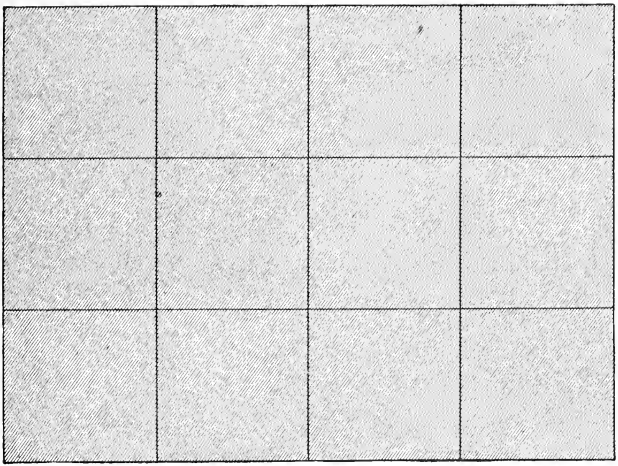
9. One and 2 thirds yards are —— feet.

10. One and 1 half yards are ———— feet.

11. Draw a 1-foot square. Draw a 3-foot square. The 3-foot square is how many times as large as the 1-foot square?

12. Which is the larger, a 1-yard square or a 3-foot square?

13. Draw a line one yard long. Divide it into 2 equal parts. Each part should be ———— long.



1. This oblong is —— inches wide and —— inches long. It contains —— square inches.

4 threes are ——.

3 fours are ——.

2 sixes are ——.

2. I am thinking of a 1-yard square divided into 1-foot squares. How many rows of 1-foot squares? How many 1-foot squares in each row?

3 threes are ——.

1. Albert had 6 hens. He bought 5 more. He then had —— hens.

2. Hattie had 10 hens. She sold 6 of them. She then had —— hens.

3. A horse needs 4 shoes. Three horses need —— shoes.

3 times 4 shoes are —— shoes.

4. Hiram earns 4 cents an hour. In how many hours can he earn 12 cents?

4 cents are contained in 12 cents —— times.

5. One third of 12 cents is —— cents.

---

6. Buttons, eggs, oranges, lemons, etc., are often bought by the **dozen.** A dozen is 12.

7. Men sometimes count eggs by taking 3 eggs in each hand.

3 eggs and 3 eggs are —— eggs.

6 eggs and 6 eggs are —— eggs.

One six is half a dozen.

Two sixes are —— dozen.

Four sixes are —— dozen.

8. Two dozen eggs are —— sixes of eggs.

REVIEW OF NUMBER FACTS.

Read first by column; then by line.

$3+2=$	2 twos =	$5-2=$	$5-3=$
$4+2=$	3 twos =	$6-2=$	$6-4=$
$4+3=$	4 twos =	$7-3=$	$7-4=$
$5+2=$	5 twos =	$7-2=$	$7-5=$
$5+3=$	6 twos =	$8-3=$	$8-5=$
$6+2=$	2 threes =	$8-2=$	$8-6=$
$5+4=$	3 threes =	$9-4=$	$9-5=$
$6+3=$	4 threes =	$9-3=$	$9-6=$
$7+2=$	2 fours =	$9-2=$	$9-7=$
$6+4=$	3 fours =	$10-4=$	$10-6=$
$7+3=$	2 fives =	$10-3=$	$10-7=$
$8+2=$	2 sixes =	$10-2=$	$10-8=$
$6+5=$	$\frac{1}{2}$ of 2 =	$11-5=$	$11-6=$
$7+4=$	$\frac{1}{2}$ of 3 =	$11-4=$	$11-7=$
$8+3=$	$\frac{1}{2}$ of 4 =	$11-3=$	$11-8=$
$9+2=$	$\frac{1}{2}$ of 5 =	$11-2=$	$11-9=$
$7+5=$	$\frac{1}{2}$ of 6 =	$12-5=$	$12-7=$
$8+4=$	$\frac{1}{2}$ of 7 =	$12-4=$	$12-8=$
$9+3=$	$\frac{1}{2}$ of 8 =	$12-3=$	$12-9=$
$\frac{1}{3}$ of 9 =	$\frac{1}{3}$ of 10 =	$\frac{1}{2}$ of 11 =	$\frac{1}{2}$ of 12 =
$\frac{1}{3}$ of 6 =	$\frac{1}{3}$ of 9 =	$\frac{2}{3}$ of 9 =	$\frac{1}{3}$ of 12 =
$\frac{2}{3}$ of 12 =	$\frac{1}{4}$ of 8 =	$\frac{1}{4}$ of 12 =	$\frac{3}{4}$ of 12 =

12 inches are 1 foot. 3 feet are 1 yard.

1 week is 7 days. 1 year is 12 months.

1 dozen is 12 ones.

1. This room is about —— yards wide and about —— yards long.

2. This room is about —— yards high.

3. The door is more than —— yards high. Is it more or less than 1 yard wide?

4. The teacher's desk is —— feet —— inches long. It is —— feet —— inches high. How wide is it?

5. Ruby is —— feet —— inches tall.

---

6. One half of 2 feet is —— foot.

7. Two feet are 1 half of —— feet.

8. One half of 4 feet is —— feet.

9. Four feet are 1 half of —— feet.

10. One half of 6 feet is —— feet.

11. Six feet are 1 half of —— feet.

12. Adam is 3 feet 8 inches tall. Oscar is 3 feet 4 inches tall. Adam is —— inches taller than Oscar.

13. Abbie is 3 feet 9 inches tall. Sarah is 3 inches taller than Abbie. Sarah is —— —— tall.

14. Four feet and 1 foot 2 inches are ————.

1. The above figure is —— inches long. It is —— inches wide.

2. The **perimeter** of a figure is the distance around it. The perimeter of the above oblong is —— inches.

3. The **area** of a figure is the amount of its surface. The area of the above oblong is —— square inches.

4. The perimeter of a 2-inch square is —— inches.

5. The area of a 2-inch square is —— square inches.

6. Draw an oblong and tell its perimeter and its area.

1. William had 7 sheep. He bought 5 more. He then had —— sheep.

2. Elsie had 12 chickens. The rain killed 5 of them. She then had —— chickens.

3. At 6 cents each, 2 melons cost —— cents.

2 times 6 cents are —— cents.

4. Ernest earns 6 cents an hour. In how many hours can he earn 12 cents?

6¢ are contained in 12¢ —— times.

5. Dora paid 12 cents for three lemons. One lemon cost —— cents.

One third of 12 cents is —— cents.

---

6. At 6¢ a dozen, 2 dozen buttons cost —— cents. Half a dozen cost —— cents.

7. Six eggs and 6 eggs and 6 eggs and 6 eggs make —— dozen eggs.

8. Six inches and 6 inches and 6 inches and 6 inches make —— feet.

9. Six months and 6 months and 6 months and 6 months make —— years.

10. Three eggs are —— —— of a dozen.

twenty  20

thirty  30

2 tens are ——.
3 tens are ——.
4 tens are forty.
5 tens are fifty.

2 tens and 1 are ——.
3 tens and 2 are ——.
4 tens and 3 are ——.
5 tens and 5 are ——.

2 tens and 5 are ——.
3 tens and 6 are ——.
4 tens and 4 are ——.
5 tens and 9 are ——.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

34 is 3 tens and ——.
53 is 5 tens and ——.

46 is 4 tens and ——.
27 is 2 tens and ——.

10 and 1 are ——.	20 and 1 are ——.
10 and 2 are ——.	20 and 2 are ——.
10 and 3 are ——.	20 and 3 are ——.
10 and 4 are ——.	20 and 4 are ——.
10 and 5 are ——.	20 and 5 are ——.
10 and 6 are ——.	20 and 6 are ——.
10 and 7 are ——.	20 and 7 are ——.
10 and 8 are ——.	20 and 8 are ——.
10 and 9 are ——.	20 and 9 are ——.
19 and 1 are ——.	29 and 1 are ——.

---

1. Charlie's book cost 25 cents and his pencil cost 2 cents. Together they cost —— cents.

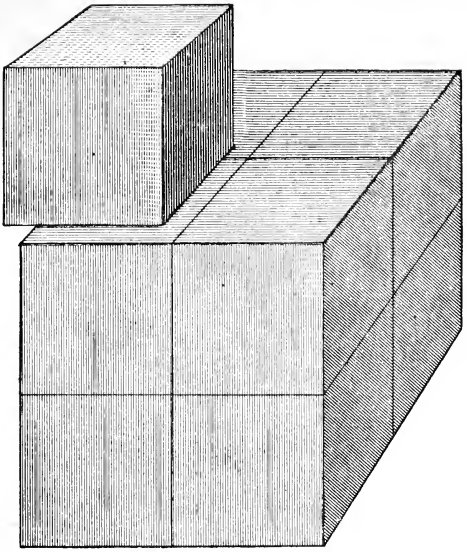
25 is —— tens and ——.

27 is —— tens and ——.

2. Thomas had 34 marbles. His brother gave him 2 more. He then had —— marbles.

12 + 2 =	22 + 2 =	32 + 2 =
14 + 2 =	24 + 2 =	34 + 2 =
16 + 2 =	26 + 2 =	36 + 2 =
18 + 2 =	28 + 2 =	38 + 2 =

A 1-inch cube.



A 2-inch cube.

1. With 1-inch cubes, build a 2-inch cube. It takes —— 1-inch cubes to make a 2-inch cube.

2. A 2-inch cube contains —— cubic inches; that is, it is —— times as large as a 1-inch cube.

2 times 2 cubic inches are —— cubic inches.

2 times 4 cubic inches are —— cubic inches.

1. Aaron paid 35 cents for a book and 3 cents for paper. For both he paid —— cents.

2. Maggie had 35 chickens. A rat killed 3 of them. She then had —— chickens.

3. A butterfly has —— wings. Three butterflies have —— wings.

3 times 4 wings are —— wings.

4. At 2 cents each, how many oranges can you buy for 10 cents?

2¢ are contained in 10¢ —— times.

5. Willis paid 8 cents for 4 lemons. One lemon cost —— cents.

One fourth of 8 cents is —— cents.

---

6. Thirteen eggs are 1 dozen and ——.
7. Thirteen cents are 1 dime and —— cents.
8. Thirteen inches are 1 foot and —— inch.
9. Thirteen months are 1 year and —— month.
10. Thirteen feet are 4 yards and —— foot.
11. Three buttons are 1 fourth of a —— ——.
12. Three inches are 1 fourth of a ——.
13. Three months are 1 fourth of a ——.

7 stars and 7 stars are —— stars.

2 sevens are ——. 7 twos are ——.

2 times 7 stars are —— stars.

7 times 2 stars are —— stars.

---

1. One week is —— days, and two weeks are —— days.

7 days and 7 days are —— days.

2 times 7 days are —— days.

Six tens are sixty. Seven tens are seventy.

Eight tens are eighty. Nine tens are ninety.

Ten tens are one hundred.

2 tens and 2 tens are ——.

One half of 40 is ——.

3 tens and 3 tens are ——.

One half of 60 is ——.

4 tens and 4 tens are ——.

One half of 80 is ——.

12 and 2 are ——. 22 and 2 are ——.
32 and 2 are ——. 42 and 2 are ——.
52 and 2 are ——. 62 and 2 are ——.
72 and 2 are ——. 82 and 2 are ——.

---

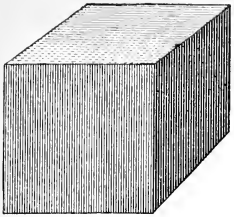
94 less 2 are ——. 84 less 2 are ——.
74 less 2 are ——. 64 less 2 are ——.
54 less 2 are ——. 44 less 2 are ——.
34 less 2 are ——. 24 less 2 are ——.
14 less 2 are ——. 14 less 1 are ——.

---

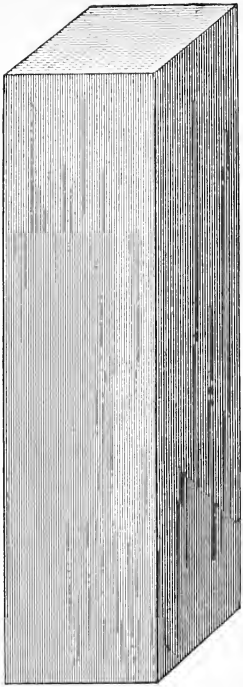
1. One half of 40 = $\frac{1}{2}$ of 6 =
   One half of 46 is ——.
2. One half of 60 = $\frac{1}{2}$ of 8 =
   One half of 68 is ——.
3. One half of 80 = $\frac{1}{2}$ of 4 =
   One half of 84 is ——.

4. Nancy's book cost 40 cents. Her sister's book cost half as much. Together they cost —— cents.

5. Julian's book cost 30 cents. His brother's book cost twice as much. His brother's book cost —— cents.



A 1-inch cube.



A square prism.

1. This prism is 1 inch wide, 1 inch thick, and 4 inches long.

2. It is equal to —— 1-inch cubes.

3. It contains —— cubic inches; that is, it is —— times as large as a 1-inch cube.

4. The prism is equal to what part of a 2-inch cube?

5. One half of a 2-inch cube contains —— cubic inches.

6. A prism 1 inch by 2 inches by 4 inches contains —— cubic inches.

1. Mr. Davis had 42 sheep. He bought 6 more. He then had —— sheep.

2. Mr. Evans had 59 sheep. Six of them died. He then had —— sheep.

3. At 7 cents a yard, 2 yards of ribbon cost —— cents.

2 times 7 cents are —— cents.

4. How many 2-cent stamps can you buy for 14 cents?

2¢ are contained in 14¢ —— times.

5. Albert paid 14 cents for 2 melons. One melon cost —— cents.

One half of 14 cents is —— cents.

---

6. Fourteen eggs are 1 dozen and ——.
7. Fourteen cents are 1 dime and —— cents.
8. Fourteen inches are 1 foot and —— inches.
9. Fourteen days are —— weeks.
10. Fourteen months are 1 year and —— months.
11. Fourteen feet are 4 yards and —— feet.
12. Nine buttons are 3 fourths of a —— ——.
13. Nine inches are 3 fourths of a ——.

5 stars and 5 stars and 5 stars =

3 and 3 and 3 and 3 and 3 =

3 times 5 stars are —— stars.

5 times 3 stars are —— stars.

---

1. Two nickels equal —— cents.
2. Three nickels equal —— cents.
3. One dime and 1 nickel equal —— cents.
4. Two dimes equal —— cents.
5. Two dimes and 1 nickel equal —— cents.
6. Three dimes equal —— cents.
7. Three dimes and 1 nickel equal —— cents.
8. Four dimes and 1 nickel equal —— cents.
9. Five dimes and 1 nickel equal —— cents.
10. A quarter and a nickel equal —— cents.
11. One yard is —— feet. Two yards are —— feet. Three yards are —— feet. Four yards are —— feet. Five yards are —— feet.

18 and 2 =	28 and 2 =
38 and 2 =	48 and 2 =
58 and 2 =	68 and 2 =
78 and 2 =	88 and 2 =

---

21 less 2 are ——.	31 less 2 are ——.
41 less 2 are ——.	51 less 2 are ——.
61 less 2 are ——.	71 less 2 are ——.
81 less 2 are ——.	91 less 2 are ——.
101 less 2 are ——.	151 less 2 are ——.

---

30 = 20 and 10.

1. One half of 30 is (1 ten and 5) ——.

50 = 40 and 10.

2. One half of 50 is (2 tens and 5) ——.

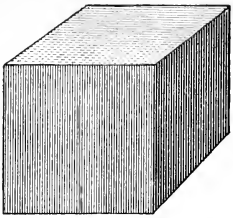
70 = 60 and 10.

3. One half of 70 is (3 tens and 5) ——.

90 = 80 and 10.

4. One half of 90 is (4 tens and 5) ——.

5. Julia's book cost 50 cents. Her brother's book cost half as much. Her brother's book cost —— cents.



1. A cube has —— equal faces. In this picture of a cube, three of the faces can be seen and —— are hidden from view.

2. Each face of a 1-inch cube is a ——-inch square.

3. Each face of a 2-inch cube is a ——-inch square.

4. The area of one face of a 2-inch cube is —— square inches.

5. Each face of a 3-inch cube is a ————.

6. A cube has —— corners. In this picture of a cube, 7 of the corners are in sight and —— is hidden from view.

7. A cube has —— edges. In this picture of a cube, 9 of the edges are in sight and —— are hidden from view.

1. There were 36 pupils in a certain room. Four more were sent in. Then there were —— pupils in the room.

2. There were 50 pupils in a certain room. Four were sent out. Then there were —— pupils in the room.

3. At 5 cents a yard, 3 yards of ribbon cost —— cents.

3 times 5 cents are —— cents.

4. How many 3-cent stamps can you buy with 15 cents?

3¢ are contained in 15¢ —— times.

5. Oscar paid 15 cents for 3 tablets. One tablet cost —— cents.

One third of 15 cents is —— cents.

---

6. Fifteen eggs are 1 dozen and ——.
7. Fifteen cents are 1 dime and —— cents.
8. Fifteen inches are 1 foot and —— inches.
9. Fifteen days are 2 weeks and —— day.
10. Fifteen months are 1 year and —— months.
11. Fifteen feet are —— yards.

8 stars and 8 stars are —— stars.

4 and 4 and 4 and 4 =

2 times 8 stars are —— stars.

8 times 2 stars are —— stars.

4 times 4 stars are —— stars.

---

1. A spider has —— legs. Two spiders have —— legs.

2 times 8 legs are —— legs.

2. A dog has —— legs. Four dogs have —— legs.

4 times 4 legs are —— legs.

3. A bird has 2 legs. Eight birds have —— legs.

8 times 2 legs are —— legs.

4. An ox needs —— shoes. Two oxen need —— shoes.

2 times 8 shoes are —— shoes.

5. A horse needs —— shoes. Four horses need —— shoes.

4 times 4 shoes are —— shoes.

19 and 2 =	29 and 2 =
39 and 2 =	49 and 2 =
59 and 2 =	69 and 2 =
79 and 2 =	89 and 2 =

---

22 less 2 are ——.	33 less 2 are ——.
45 less 2 are ——.	54 less 2 are ——.
67 less 2 are ——.	73 less 2 are ——.
89 less 2 are ——.	98 less 2 are ——.
102 less 2 are ——.	152 less 2 are ——.

---

26 = 20 and 6.

1. One half of 26 is (1 ten and 3) ——.

48 = 40 and 8.

2. One half of 48 is (2 tens and 4) ——.

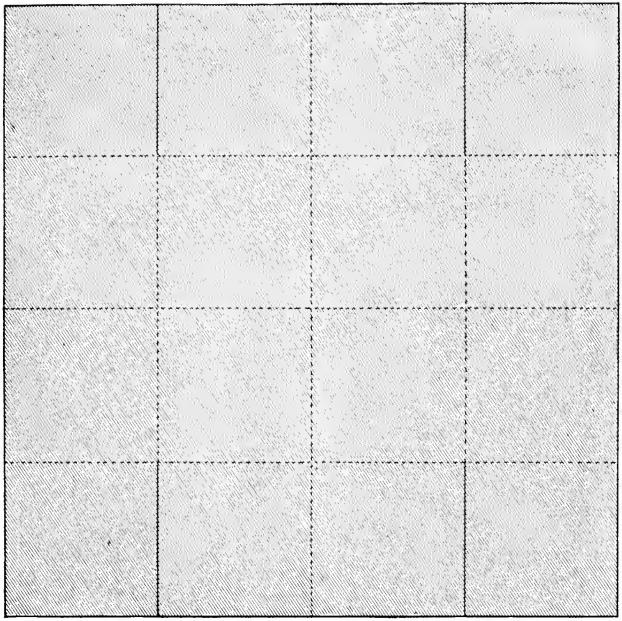
64 = 60 and 4.

3. One half of 64 is (3 tens and 2) ——.

82 = 80 and 2.

4. One half of 82 is (4 tens and 1) ——.

5. Jennie's book cost 46 cents. Her sister's book cost half as much. Her sister's book cost —— cents.



Take a 4-inch square of paper. Fold lower edge upon upper edge. Crease. Unfold. Fold lower edge to the crease. Crease. Unfold. Fold upper edge to the middle crease. Crease. Unfold. Fold right edge upon left edge. Crease. Unfold. Fold right edge to the middle crease. Crease. Unfold. Fold left edge to the middle crease. Crease. Unfold. Cut as indicated by the heavy lines. Then fold into a box 2 inches square, having the four squares in the middle for the bottom of the box. Paste the corner squares upon those next to them. The box will contain —— cubic inches.

1. There were 28 pupils in a certain room. Four more were sent in. Then there were —— pupils in the room.

2. There were 42 pupils in a certain room. Four were sent out. Then there were —— pupils in the room.

3. There were 8 pupils in each row of seats. How many in 2 rows?

2 times 8 pupils are —— pupils.

4. How many 4-cent stamps can you buy with 16 cents?

4¢ are contained in 16¢ —— times.

5. Bernie paid 16 cents for 2 boxes of berries. One box of berries cost —— cents.

One half of 16 cents is —— cents.

---

6. Sixteen eggs are 1 dozen and ——.
7. Sixteen cents are 1 dime and —— cents.
8. Sixteen inches are 1 foot and —— inches.
9. Sixteen days are 2 weeks and —— days.
10. Sixteen months are 1 year and —— months.
11. Sixteen feet are 5 yards and —— foot.

9 stars and 9 stars are —— stars.

6 and 6 and 6 are ——

3 + 3 + 3 + 3 + 3 + 3 =

9 twos are ——.

2 times 9 stars are —— stars.

9 times 2 stars are —— stars.

3 times 6 stars are —— stars.

6 times 3 stars are —— stars.

1. A butterfly has —— legs. Two butterflies have —— legs. Three butterflies have —— legs.

2 times 6 legs are —— legs.

3 times 6 legs are —— legs.

2. On one front foot and one hind foot a cat has —— toes. On both front feet and both hind feet a cat has —— toes.

2 times 9 toes are —— toes.

3. Six teaspoons make a set. In 2 sets there are —— teaspoons. In 3 sets there are —— teaspoons.

19 and 3 =	29 and 3 =
39 and 3 =	49 and 3 =
59 and 3 =	69 and 3 =
79 and 3 =	89 and 3 =
99 and 3 =	98 and 3 =

---

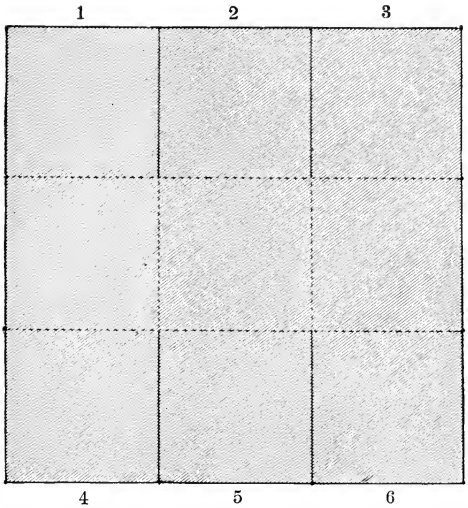
23 less 3 are ——.	34 less 3 are ——.
46 less 3 are ——.	53 less 3 are ——.
68 less 3 are ——.	75 less 3 are ——.
89 less 3 are ——.	92 less 3 are ——.
103 less 3 are ——.	153 less 3 are ——.

---

1. One half of 22 =	$\frac{1}{2}$ of 24 =
2. One half of 26 =	$\frac{1}{2}$ of 28 =
3. One half of 42 =	$\frac{1}{2}$ of 44 =
4. One half of 46 =	$\frac{1}{2}$ of 48 =
5. One half of 62 =	$\frac{1}{2}$ of 64 =
6. One half of 66 =	$\frac{1}{2}$ of 68 =
7. One half of 82 =	$\frac{1}{2}$ of 84 =
8. One half of 86 =	$\frac{1}{2}$ of 88 =

Add by 10's to 100; thus, 10, 20, 30, 40, etc.

Add by 10's from 2 to 102: thus, 2, 12, 22, etc.



Take a 4-inch square of paper. Fold as suggested on page 59. Cut off a row of 1-inch squares from one side of the paper, and a row from one end of what remains. You will then have a 3-inch square. Cut this as indicated by the heavy lines in the diagram on this page; then fold into a box 1 inch square and 1 inch deep, making the center square the bottom of the box. Paste No. 1 upon No. 2, and No. 3 upon No. 1. Paste No. 4 upon No. 5, and No. 6 upon No. 4. The box will contain —— cubic inch.

Observe that this box will contain exactly one fourth as much as the box described on page 59.

Measure 1 cubic inch of sand; 2 cubic inches; 3 cubic inches; 4 cubic inches.

To the Teacher.—Provide a few small boxes or bottles and require the pupils to estimate in cubic inches the capacity of each. Then require the pupils to measure each, using sand and the box described above.

1. The mercury in the thermometer stood at 68. It went up 10 degrees. It then stood at ——.

2. The mercury in the thermometer stood at 74. It went down 10 degrees. It then stood at ——.

3. At one dime a yard, 5 yards of ribbon cost —— cents.

5 times 10 cents are —— cents.

4. Hiram paid 40 cents for tickets to the matinee. The tickets cost 10 cents each. There were —— tickets.

10¢ are contained in 40¢ —— times.

5. Ada bought 3 ferry tickets for 18 cents. One ticket cost —— cents.

One third of 18 cents is —— cents.

---

6. Seventeen eggs are 1 dozen and ——.
7. Seventeen cents are 1 dime and —— cents.
8. Seventeen inches are 1 foot and —— inches.
9. Seventeen days are 2 weeks and —— days.
10. Eighteen eggs are 1 and —— —— dozen.
11. Eighteen inches are 1 and —— —— feet.
12. Eighteen days are 2 weeks and —— days.

10 stars and 10 stars are —— stars.

5 and 5 and 5 and 5 =

4 + 4 + 4 + 4 + 4 =

5 times 4 stars are —— stars.

4 times 5 stars are —— stars.

2 times 10 stars are —— stars.

10 times 2 stars are —— stars.

---

2 nickels are equal to —— dime.

3 nickels are equal to —— cents.

1. A horse needs —— shoes. Two horses need —— shoes. Three horses need —— shoes. Four horses need —— shoes. Five horses need —— shoes.

2. The area of an oblong 4 inches by 5 inches is —— square inches.

4 times 5 sq. in. are —— sq. in.

5 times 4 sq. in. are —— sq. in.

18 and 4 =	28 and 4 =
38 and 4 =	48 and 4 =
58 and 4 =	68 and 4 =
78 and 4 =	88 and 4 =

---

22 less 4 =	32 less 4 =
42 less 4 =	52 less 4 =
68 less 4 =	78 less 4 =
89 less 4 =	97 less 4 =
102 less 4 =	152 less 4 =

---

36 = 30 and 6.

1. One third of 36 is (1 ten and 2) ——.

39 = 30 and 9.

2. One third of 39 is (1 ten and 3) ——.

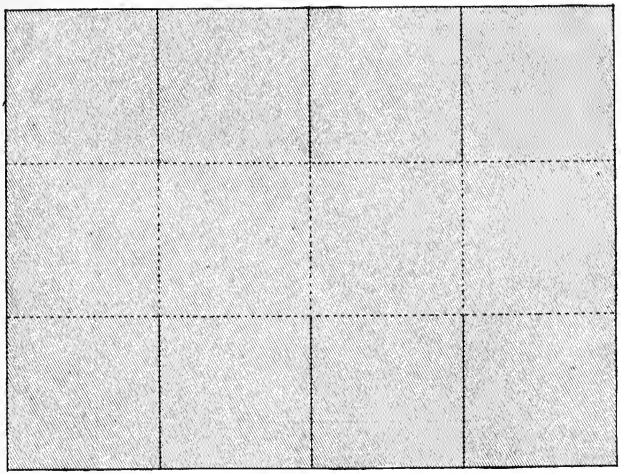
63 = 60 and 3.

3. One third of 63 is (2 tens and 1) ——.

4. Bessie's book cost 39 cents. Her sister's book cost one third as much. Her sister's book cost —— cents.

Subtract by 10's from 100 to 10.

Subtract by 10's from 102 to 2.



Fold as suggested on page 59. Cut off a row of 1-inch squares from one side of the paper. Cut also as indicated by the heavy lines in the diagram on this page. Fold and paste so as to make a 1-inch cube.

Observe the number of its corners, edges, and faces. Each face is what kind of a square? How many such cubes can be put into the box described on page 59? How many such cubes are necessary to build a 2-inch cube? See page 47.

---

1. A cube has —— faces.
2. A cube has —— corners.
3. A cube has —— edges.
4. Each face of a cube is a square.

1. The mercury in the thermometer stood at 78. It went up 4 degrees. It then stood at ——.

2. The mercury in the thermometer stood at 92. It went down 4 degrees. It then stood at ——.

3. At 20 cents a yard, 2 yards of lace cost —— cents.

2 times 20 cents are —— cents.

4. Miriam earns 4 cents an hour. To earn 20 cents, she must work —— hours.

4 cents are contained in 20 cents —— times.

5. Belle paid 20 cents for 4 tickets. One ticket cost —— cents.

One fourth of 20 cents is —— cents.

---

6. Nineteen buttons are 1 dozen and ——.
7. Nineteen cents are 1 dime and —— cents.
8. Nineteen days are 2 weeks and —— days.
9. Nineteen inches are 1 foot and —— inches.
10. Nineteen months are 1 year and —— months.
11. Twenty buttons are 1 dozen and ——.
12. Twenty inches are 1 foot and —— inches.
13. Twenty months are 1 year and —— months.

7 and 7 and 7 =

7 threes =

3 times 7 stars are —— stars.

7 times 3 stars are —— stars.

2 3-cent stamps cost —— cents.

3 3-cent stamps cost —— cents.

4 3-cent stamps cost —— cents.

5 3-cent stamps cost —— cents.

6 3-cent stamps cost —— cents.

7 3-cent stamps cost —— cents.

1. There are —— days in one week.
2. There are —— days in two weeks.
3. There are —— days in three weeks.
4. Two dimes and —— cent equal 21 cents.
5. The area of an oblong 3 inches by 7 inches is —— square inches.

3 times 7 sq. in. are —— sq. in.

7 times 3 sq. in. are —— sq. in.

17 and 4 =	27 and 4 =
37 and 4 =	47 and 4 =
57 and 4 =	67 and 4 =
77 and 4 =	87 and 4 =
97 and 4 =	96 and 4 =

---

21 less 4 =	31 less 4 =
41 less 4 =	51 less 4 =
65 less 4 =	74 less 4 =
87 less 4 =	94 less 4 =
101 less 4 =	151 less 4 =

---

66 = 60 and 6.

1. One third of 66 is (2 tens and 2) ——.

69 = 60 and 9.

2. One third of 69 is (2 tens and 3) ——.

93 = 90 and 3.

3. One third of 93 is (3 tens and 1) ——.

Add by 2's from 2 to 50.

Subtract by 2's from 50 to 2.

Add by 10's from 4 to 104.

Subtract by 10's from 104 to 4.

Take an 8-inch square of paper. Fold as directed on page 59. This will make 2-inch squares instead of 1-inch squares. Cut as directed on page 67. Fold and paste so as to make a 2-inch cube.

Observe the number of its corners, edges, and faces. Each face is what kind of a square? The area of each face is how many square inches? Each face is how many times as large as the face of a 1-inch cube.

REVIEW PAGE 43.

Think of a 3-inch square.

1. The perimeter of a 3-inch square is —— inches.

4 times 3 inches are —— inches.

2. The area of a 3-inch square is —— square inches.

3 times 3 sq. in. are —— sq. in.

Think of a 4-inch square.

3. The perimeter of a 4-inch square is —— inches.

4 times 4 inches are —— inches.

4. The area of a 4-inch square is —— square inches.

4 times 4 sq. in. are —— sq. in.

---

5. Tell the perimeter and the area of a 2-inch square. Of a 1-inch square.

1. The mercury in the thermometer stood at 64. It went up 20 degrees. It then stood at ——.

2. The mercury in the thermometer stood at 46. It went down 20 degrees. It then stood at ——.

3. In an orchard there were 3 rows of trees, and 7 trees in each row. In all there were —— trees.

3 times 7 trees are —— trees.

4. A lady divided 18 apples among some boys, giving to each boy 3 apples. There were —— boys.

3 apples are contained in 18 apples —— times.

5. Lilian divided a piece of ribbon 20 inches long into 4 equal pieces. Each piece was —— inches long.

One fourth of twenty inches is —— inches.

---

6. Twenty-one buttons are 1 dozen and ——.

7. Twenty-one cents are 2 dimes and ————.

8. Twenty-one inches are 1 foot and —— inches.

9. Twenty-one months are 1 year and —— months.

10. Twenty-one days are —— weeks.

11. Twenty-one feet are —— yards.

8 and 8 and 8 =

3 times 8 stars are —— stars.

8 times 3 stars are —— stars.

1. An ox needs —— shoes. Three oxen need —— shoes.

3 times 8 shoes are —— shoes.

2. A tripod has 3 legs. Eight tripods have —— legs.

8 times 3 legs are —— legs.

3. Three weeks and —— days are 24 days.

4. Two dimes and —— cents are 24 cents.

5. The area of an oblong 3 inches by 8 inches is —— square inches.

3 times 8 sq. in. are —— sq. in.

8 times 3 sq. in. are —— sq. in.

6. Two eights are ——. Three eights are ——.

7. Two sevens are ——. Three sevens are ——.

8. Two sixes are ——. Three sixes are ——.

9. Two fives are ——. Three fives are ——.

17 and 5 =	27 and 5 =
37 and 5 =	47 and 5 =
57 and 5 =	67 and 5 =
77 and 5 =	87 and 5 =

---

21 less 5 =	31 less 5 =
41 less 5 =	51 less 5 =
69 less 5 =	78 less 5 =
86 less 5 =	95 less 5 =
101 less 5 =	151 less 5 =

---

1. One half of 24 =	$\frac{1}{2}$ of 25 is ——.
2. One half of 26 =	$\frac{1}{2}$ of 27 is ——.
3. One half of 22 =	$\frac{1}{2}$ of 23 is ——.
4. One half of 44 =	$\frac{1}{2}$ of 45 is ——.
5. One half of 46 =	$\frac{1}{2}$ of 47 is ——.
6. One half of 42 =	$\frac{1}{2}$ of 43 is ——.
7. One half of 48 =	$\frac{1}{2}$ of 49 is ——.

$\frac{1}{2}$ of 4 inches =	4 inches are $\frac{1}{2}$ of ——.
$\frac{1}{2}$ of 5 inches =	5 inches are $\frac{1}{2}$ of ——.
$\frac{1}{2}$ of 6 inches =	6 inches are $\frac{1}{2}$ of ——.

Take a 12-inch square of paper. Fold as directed on page 59. This will divide the paper into 3-inch squares. Cut as directed on page 67. Fold and paste so as to make a 3-inch cube.

Observe the number of its corners, edges, and faces. Each face is what kind of a square? The area of each face is how many square inches? Each face is how many times as large as the face of a 1-inch cube?

Think of an oblong 2 inches by 3 inches.

1. The perimeter of an oblong 2 inches by 3 inches is ——.

3 in. + 3 in. + 2 in. + 2 in. =

2. The area of an oblong 2 inches by 3 inches is —— square inches.

2 times 3 sq. in. are —— sq. in.

3 times 2 sq. in. are —— sq. in.

Think of an oblong 2 inches by 4 inches.

3. The perimeter of an oblong 2 inches by 4 inches is —— inches.

4 in. + 4 in. + 2 in. + 2 in. =

4. The area of an oblong 2 inches by 4 inches is —— square inches.

2 times 4 sq. in. are —— sq. in.

4 times 2 sq. in. are —— sq. in.

1. A farmer had 35 sheep in one pen and 6 in another. In both pens there were —— sheep.

2. Edwin drew a line 32 inches long. He erased 6 inches of the line. What remained was —— inches long.

3. An electric car goes at the rate of 8 miles an hour. In three hours it goes —— miles.

3 times 8 miles are —— miles.

4. How many 2-quart jars can be filled from a pail containing 14 quarts?

2 quarts are contained in 14 quarts —— times.

5. Mr. Nelson paid 48 dollars for the rent of a house for 2 months. This was at the rate of —— dollars a month.

One half of 48 dollars is —— dollars.

---

6. Twenty-two days are 3 weeks and —— day.
7. Twenty-three days are 3 weeks and —— days.
8. Twenty-four days are 3 weeks and —— days.
9. Twenty-two cents are 2 dimes and —— cents.
10. Twenty-four cents are 2 dimes and —— cents.
11. Twenty-four feet are —— yards.

6 and 6 and 6 and 6 =

4 times 6 stars are —— stars.

6 times 4 stars are —— stars.

2 times 12 stars are —— stars.

2 dozen are ——.

2 years are —— months.

2 feet are —— inches.

1. One and 1 half feet are —— inches.
2. One and 1 half years are —— months.
3. One and 1 half dozen are ——.
4. One and 1 fourth feet are —— inches.
5. One and 1 fourth years are —— months.
6. One and 1 fourth dozen are ——.
7. The area of an oblong 4 inches by 6 inches is —— square inches.

4 times 6 sq. in. are —— sq. in.

6 times 4 sq. in. are —— sq. in.

16 and 5 = 26 and 5 =
36 and 5 = 46 and 5 =
56 and 5 = 66 and 5 =
76 and 5 = 86 and 5 =

---

22 less 5 = 32 less 5 =
42 less 5 = 52 less 5 =
68 less 5 = 79 less 5 =
85 less 5 = 96 less 5 =

---

64 = 60 and 4.

1. One half of 64 = $\frac{1}{2}$ of 65 is ——.
2. One half of 66 = $\frac{1}{2}$ of 67 is ——.
3. One half of 62 = $\frac{1}{2}$ of 63 is ——.

84 = 80 and 4.

4. One half of 84 = $\frac{1}{2}$ of 85 is ——.
5. One half of 86 = $\frac{1}{2}$ of 87 is ——.
6. One half of 82 = $\frac{1}{2}$ of 83 is ——.

$\frac{1}{2}$ of 7 inches = 7 inches are $\frac{1}{2}$ of ——.
$\frac{1}{2}$ of 8 inches = 8 inches are $\frac{1}{2}$ of ——.
$\frac{1}{2}$ of 9 inches = 9 inches are $\frac{1}{2}$ of ——.

Take an 8-inch square of paper. Fold as directed on page 59. This will divide the paper into 2-inch squares. Cut as directed on page 63. Fold and paste so as to make a box 2 inches by 2 inches by 2 inches.

Fill the box with sand, using the box described on page 63 as a measure.

Observe that the box will hold 8 cubic inches of sand; that 4 cubic inches fill the box "half full."

Observe that the solid content of the box is the same as the solid content of a 2-inch cube. See page 47.

Think of an oblong 3 *inches by* 4 *inches.*

1. The perimeter of an oblong 3 inches by 4 inches is —— inches.

4 in. + 4 in. + 3 in. + 3 in. =

2. The area of an oblong 3 inches by 4 inches is —— square inches.

3 times 4 sq. in. are —— sq. in.

4 times 3 sq. in. are —— sq. in.

Think of an oblong 2 *inches by* 6 *inches.*

3. The perimeter of an oblong 2 inches by 6 inches is —— inches.

6 in. + 6 in. + 2 in. + 2 in. =

4. The area of an oblong 2 inches by 6 inches is —— square inches.

2 times 6 sq. in. are —— sq. in.

6 times 2 sq. in. are —— sq. in.

1. Marie paid 35¢ for a book and 11¢ for paper. For both she paid ——¢.

2. Isaac had a rope 35 feet long. He gave his playmate 11 feet of the rope. He then had —— feet.

3. A train moves at the rate of 23 miles an hour. In 3 hours it moves —— miles.

3 times 23 miles are —— miles.

4. A 4-inch square contains —— square inches. A 4-inch square is how many times as large as a 2-inch square?

4 sq. in. are contained in 16 sq. in. —— times.

5. Herman received 24¢ for working 4 hours. This was at the rate of —— cents per hour.

One fourth of 24¢ is —— cents.

---

6. Twenty-four square inches are equal to an oblong 4 inches wide and —— inches long.

7. Twenty-four square inches are equal to an oblong 2 inches wide and —— inches long.

8. Twenty square inches are equal to an oblong 2 inches wide and —— inches long.

5 times 5 stars are —— stars.

1. Five nickels are —— cents.
2. Two dimes and 5 cents are —— cents.
3. Two years and 2 months are —— months.
4. Two feet and 1 inch are —— inches.
5. Two dozen and 3 are ——.
6. Three weeks and 4 days are —— days.
7. Eight yards and —— foot are 25 feet.
8. Eight yards and 2 feet are —— feet.
9. The area of a 4-inch square is —— square inches.

   4 times 4 sq. in. are —— sq. in.

10. The area of an oblong 3 inches by 4 inches is —— square inches.

    3 times 4 sq. in. are —— sq. in.

    4 times 3 sq. in. are —— sq. in.

15 and 6 =	25 and 6 =
35 and 6 =	45 and 6 =
55 and 6 =	65 and 6 =
75 and 6 =	85 and 6 =
95 and 6 =	94 and 6 =

---

22 less 6 =	32 less 6 =
42 less 6 =	52 less 6 =
68 less 6 =	79 less 6 =
86 less 6 =	97 less 6 =
102 less 6 =	152 less 6 =

---

30 = 20 and 10.

1. One half of 30 = $\frac{1}{2}$ of 32 is ——.

50 = 40 and 10.

2. One half of 50 = $\frac{1}{2}$ of 52 is ——.

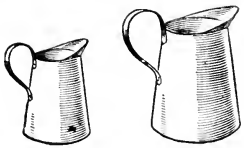
70 = 60 and 10.

3. One half of 70 = $\frac{1}{2}$ of 72 is ——.

90 = 80 and 10.

4. One half of 90 = $\frac{1}{2}$ of 92 is ——.

$\frac{1}{2}$ of 11 inches =	11 inches are $\frac{1}{2}$ of —— in.
$\frac{1}{2}$ of 13 inches =	13 inches are $\frac{1}{2}$ of —— in.



1. *Two pints are* 1 *quart.*

   Two quarts are —— pints.

2. Three pints are ———— quarts.

   Three quarts are —— pints.

3. Four pints are —— quarts.

   Four quarts are —— pints

4. Five pints are ———— quarts.

   Five quarts are —— pints.

5. Six pints are —— quarts.

   Six quarts are —— pints.

6. Seven pints are ———— quarts.

   Seven quarts are —— pints.

7. Eight pints are —— quarts.

   Eight quarts are —— pints.

8. Nine pints are ———— quarts.

   Nine quarts are —— pints.

9. Ten pints are —— quarts.

   Ten quarts are —— pints.

1. Albert paid 25¢ for mittens and 12¢ for a tie. For both he paid —— cents.

2. From a can of milk containing 27 quarts, 12 quarts were sold. There remained in the can —— quarts.

3. A family used 5 quarts of milk each day. In 5 days this family used —— quarts.

5 times 5 quarts are —— quarts.

4. Augustus divided a piece of copper wire 24 inches long into pieces 6 inches long. There were —— pieces.

6 in. are contained in 24 in. —— times.

5. Alfred divided a piece of copper wire 25 inches long into 5 equal pieces. Each piece was —— inches long.

One fifth of 25 inches is —— inches.

---

6. Twenty-five days are 3 weeks and —— days.
7. Twenty-five inches are 2 feet and —— inch.
8. Twenty-five months are 2 years and —— mo.
9. Twenty-five eggs are 2 dozen and ——.
10. Twenty-five feet are 8 yards and —— foot.

3 times 9 stars are —— stars.

9 times 3 stars are —— stars.

1. Five nickels and 2 cents are —— cents

2. Two dimes and 6 cents are —— cents.

3. Two feet and 3 inches are —— inches.

4. Two years and 2 months are —— months.

5. Two years and 3 months are —— months.

6. Three weeks and 3 days are —— days.

7. Twelve quarts and 1 pint are —— pints.

8. The area of an oblong 3 inches by 9 inches is —— square inches.

3 times 9 sq. in. are —— sq. in.

9 times 3 sq. in. are —— sq. in.

9. The area of an oblong 3 inches by 5 inches is —— square inches.

3 times 5 sq. in. are —— sq. in.

5 times 3 sq. in. are —— sq. in.

10. The area of an oblong 3 inches by 6 inches is —— square inches.

17 and 11 =	27 and 11 =
37 and 11 =	47 and 11 =
57 and 11 =	67 and 11 =
77 and 11 =	87 and 11 =

---

48 less 11 =	58 less 11 =
67 less 11 =	77 less 11 =
89 less 11 =	99 less 11 =
108 less 11 =	158 less 11 =

---

32 = 20 and 10 and 2.

1. One half of 32 = ½ of 34 is ——.
   One half of 36 = ½ of 38 is ——.

52 = 40 and 10 and 2.

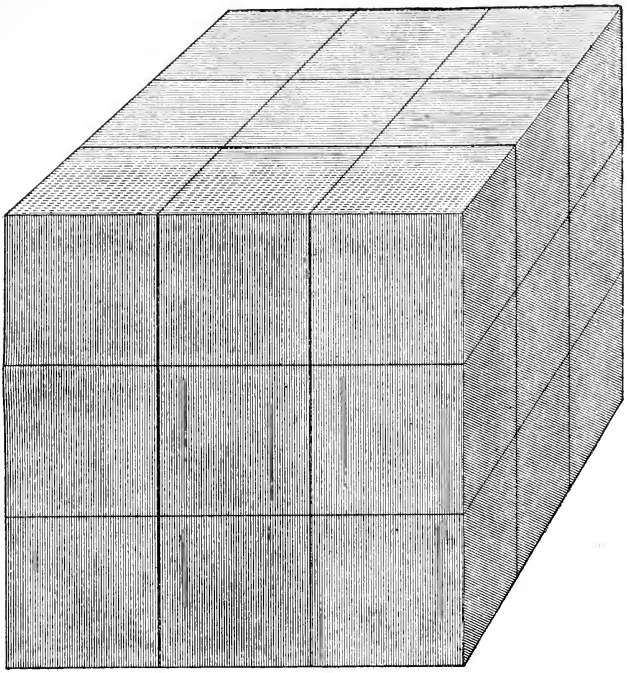
2. One half of 52 = ½ of 54 is ——.
   One half of 56 = ½ of 58 is ——.

72 = 60 and 10 and 2.

3. One half of 72 = ½ of 74 is ——.
   One half of 76 = ½ of 78 is ——.

92 = 80 and 10 and 2.

4. One half of 92 = ½ of 94 is ——.
   One half of 96 = ½ of 98 is ——.



1. A 3-inch cube contains —— cubic inches; that is, it is —— times as large as a 1-inch cube.

3 times 3 cubic inches are —— cubic inches.

3 times 9 cubic inches are —— cubic inches.

1. A farmer had 34 sheep in one pen and 12 in another. In both he had —— sheep.

2. A dealer had 46 sheep. He sold 12 of them. He then had —— sheep.

3. A family used 3 quarts of milk each day. In 1 week this family used —— quarts.

7 times 3 quarts are —— quarts.

4. A lady had a 3-inch cube of maple sugar. She divided it equally among her grandchildren. Each child received 9 cubic inches. There were —— children.

9 cu. in. are contained in 27 cu. in. —— times.

5. Clyan divided a 2-inch cube of maple sugar equally between himself and Chester. Each had —— cubic inches.

One half of 8 cu. in. is —— cu. in.

---

6. Twenty-six inches are 2 feet and —— inches.
7. Twenty-six days are 3 weeks and —— days.
8. Twenty-six months are 2 years and —— mo.
9. Twenty-seven buttons are 2 dozen and ——.
10. Twenty-six (20 and 6) pints are —— quarts.

4 times 7 stars are —— stars.

1. Two feet and 4 inches are —— inches.
2. Two dimes and 6 cents are —— cents.
3. Two years and 4 months are —— months.
4. Four weeks are —— days.
5. Four weeks and 1 day are —— days.
6. Two dozen and 5 eggs are —— eggs.
7. Fourteen quarts (10 and 4) are —— pints.
8. The area of an oblong 4 inches by 7 inches is —— square inches.

Two apples × 2 = *	2 times 2 are ——.
Three feet × 2 =	2 times 3 are ——.
Four chairs × 2 =	2 times 4 are ——.
Five dimes × 2 =	2 times 5 are ——.
Six inches × 2 =	2 times 6 are ——

* To be read, Two apples multiplied by 2 =

16 and 12 =	26 and 12 =
36 and 12 =	46 and 12 =
56 and 12 =	66 and 12 =
76 and 12 =	86 and 12 =
96 and 12 =	90 and 12 =

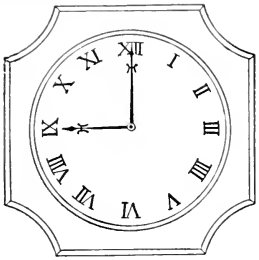
---

27 less 12 =	37 less 12 =
47 less 12 =	57 less 12 =
68 less 12 =	78 less 12 =
89 less 12 =	99 less 12 =
107 less 12 =	157 less 12 =

1. One third of 6 stars is —— stars.
   Six stars are 1 third of —— stars.
2. One third of 9 stars is —— stars.
   Nine stars are 1 third of —— stars.

---

3. Add by 2's from 1 to 51; thus, 1, 3, 5, etc.
4. Subtract by 2's from 51 to 1; thus, 51, 49, etc.
5. 2 + 2 + 1 + 1 + 2 + 1 + 2 + 2 + 2 + 1 + 2 + 2 =



1. From 9 o'clock until 12 o'clock it is —— hours.

2. From 1 o'clock until 4 o'clock it is —— hours.

3. *An hour is* 60 *minutes.* Half an hour is —— minutes. A quarter of an hour is —— minutes.

4. From 1 o'clock until quarter past 1 it is —— minutes.

5. From quarter past 1 until quarter of 2 it is —— minutes.

6. From 20 minutes past 1 until 20 minutes of 2 it is —— minutes.

7. Look upon the clock face and count by 5's from 0 to 60.

8. Where is the long hand of the clock at 25 minutes past 12? At quarter past 1? At half past 2? At quarter of 3?

1. If to a rope 24 feet long 13 feet be added, the rope will then be —— feet long.

24 ft. + 13 ft. =

2. If 13 feet be cut off from a rope 36 feet long, the remainder will be —— feet long.

36 ft. − 13 ft. =

3. Charles had a piece of rope 9 feet long. Benjamin had a piece 3 times as long. Benjamin's rope was —— feet long.

9 ft. × 3 =

4. Henry divided a piece of rope 28 feet long into pieces 7 feet long. There were —— pieces.

28 ft. ÷ 7 ft. =

5. James divided a piece of rope 21 feet long into 3 equal pieces. Each piece was —— feet long.

21 ft. ÷ 3 =

6. Twenty-eight inches are 2 feet and —— inches.

7. Twenty-nine days are —— weeks and —— day.

8. Twenty-eight feet are 9 yards and —— foot.

9. Twenty-eight square inches are equal to an oblong 4 inches by —— inches.

28 sq. in. ÷ 4 sq. in. =

5 times 6 stars are —— stars.

6 times 5 stars are —— stars.

1. Two feet and 6 inches are —— inches.
2. Two dimes and 9 cents are —— cents.
3. Two years and 6 months are —— months.
4. Two dozen and 5 eggs are —— eggs.
5. Four weeks and 2 days are —— days.
6. Nine yards and 1 foot are —— feet.
7. The area of an oblong 5 inches by 6 inches is —— square inches.

5 times 6 sq. in. are —— sq. in.

6 times 5 sq. in. are —— sq. in.

3 times 2 are ——.	3 times 6 are ——.
3 times 3 are ——.	3 times 7 are ——.
3 times 4 are ——.	3 times 8 are ——.
3 times 5 are ——.	3 times 9 are ——.

13 and 13 =	23 and 13 =
33 and 13 =	43 and 13 =
53 and 13 =	63 and 13 =
73 and 13 =	83 and 13 =

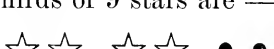
---

28 less 13 =	38 less 13 =
48 less 13 =	58 less 13 =
69 less 13 =	79 less 13 =
87 less 13 =	97 less 13 =
108 less 13 =	158 less 13 =

1. Two thirds of 6 stars are —— stars.

2. Six stars are 2 thirds of —— stars.

3. Two thirds of 9 stars are —— stars.



4. Four stars are 2 thirds of —— stars.

Add by 3's from 3 to 51; thus, 3, 6, 9, 12, etc.

1. Carl works from 7 o'clock in the morning until noon; and from 1 o'clock in the afternoon until 6 o'clock. Each day he works —— hours.

2. From 5 minutes of 10 o'clock to 5 minutes after 10 o'clock it is —— minutes.

3. From 10 minutes before 9 o'clock to 10 minutes after 9 o'clock it is —— minutes.

4. David works from 8 o'clock in the evening until 4 o'clock in the morning. Each night he works —— hours.

5. Tell where the hands of the clock are at 25 minutes past 12; at 25 minutes before 1. From 25 minutes past 12 to 25 minutes before 1 it is —— minutes.

6. From 20 minutes past 12 to 20 minutes before 1 it is —— minutes.

7. A train was due at quarter past 4. It arrived at 20 minutes past 4. It was —— minutes late.

8. A certain school is in session 5 hours each day and 5 days each week. How many hours of school in each week? How many hours of school in 2 weeks? How many hours of school in 3 weeks?

1. Willie left the school-room at 10 minutes past 2 and was absent 15 minutes. He returned at —— minutes past 2.

10 min. + 15 min. =

2. Harry left the school-room at quarter past 2 and returned at 25 minutes past 2. He was absent —— minutes.

25 min. − 15 min. =

3. Ora was tardy 10 minutes. Samuel was tardy 6 times as many minutes as Ora. Samuel was tardy —— minutes, or 1 ——.

10 min. × 6 =

4. A boy earned 5 cents an hour. To earn 30 cents he must work —— hours.

30¢ ÷ 5¢ =

5. A man earns 90 cents in 3 hours. In one hour he earns —— cents.

90¢ ÷ 3 =

6. Thirty inches are 2 feet and —— inches.

7. Thirty days are 4 weeks and —— days.

8. Thirty square inches are equal to an oblong 5 inches by —— inches.

30 sq. in. ÷ 5 sq. in. =

4 times 8 stars are —— stars.

8 times 4 stars are —— stars.

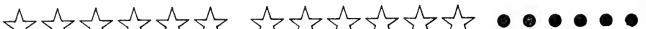
1. Two feet and 7 inches are —— inches.
2. Four weeks and 3 days are —— days.
3. Two years and 8 months are —— months.
4. Ten yards and 1 foot are —— feet.
5. Two dozen and 8 eggs are —— eggs.
6. Three dimes and 2 cents are —— cents.
7. The area of an oblong 4 inches by 8 inches is —— square inches.

Two apples × 4 =	4 times 2 are ——.
Three feet × 4 =	4 times 3 are ——.
Four chairs × 4 =	4 times 4 are ——.
Five dimes × 4 =	4 times 5 are ——.
Six inches × 4 =	4 times 6 are ——.
Seven pints × 4 =	4 times 7 are ——.
Eight years × 4 =	4 times 8 are ——.

13 and 20 =	25 and 20 =
32 and 20 =	44 and 20 =
56 and 20 =	65 and 20 =
78 and 20 =	89 and 20 =

27 less 20 =	36 less 20 =
44 less 20 =	55 less 20 =
63 less 20 =	78 less 20 =
81 less 20 =	92 less 20 =

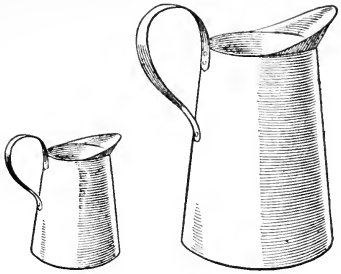
1. Two thirds of 12 stars are —— stars.



2. Twelve stars are 2 thirds of —— stars.

ADD.

a	b	c	d	e	f	g	h
2	2	4	2	1	3	2	1
2	3	1	2	4	1	2	2
1	1	2	1	2	2	4	2
2	3	3	3	2	3	2	2
2	2	2	1	1	2	2	2
1	1	2	2	3	1	4	1



1. *One gallon is 4 quarts.*

   One quart is —— —— of a gallon.

2. Two gallons are —— quarts.

   Two quarts are —— —— of a gallon.

3. Three gallons are —— quarts.

   Three quarts are —— —— of a gallon.

4. Four gallons are —— quarts.

   Four quarts are —— gallon.

5. Five gallons are —— quarts.

   Five quarts are ———— gallons.

6. Six gallons are —— quarts.

   Six quarts are ———— gallons.

7. Seven gallons are —— quarts.

   Seven quarts are ———— gallons.

1. A dealer had 24 quarts of milk in one can and 14 quarts in another. In both he had —— quarts.

24 qt. + 14 qt. =

2. Mr. Hill had 36 quarts of milk in a can. From this he sold 13 quarts. There remained —— quarts.

36 qt. − 13 qt. =

3. A family used a gallon of milk each day. In a week this family used —— quarts of milk.

4 qt. × 7 =

4. Mr. Boston divided 24 quarts of milk among some customers, giving to each 1 gallon. There were —— customers.

24 qt. ÷ 4 qts. =

5. A farmer divided 18 quarts of milk equally among 3 calves. Each calf had —— quarts.

18 qt. ÷ 3 =

6. Thirty-two cents are 3 dimes and —— cents.

7. Thirty-two inches are 2 feet and —— inches.

8. Thirty-two square inches are equal to an oblong 4 inches by —— inches.

9. Thirty square inches are equal to an oblong 3 inches by —— inches.

5 times 7 stars are —— stars.

7 times 5 stars are —— stars.

1. Two feet and 10 inches are —— inches.
2. Two feet and 11 inches are —— inches.
3. Eight gallons and 3 quarts are —— quarts.
4. Ten yards and 4 feet are —— feet.
5. Two dozen and 10 eggs are —— eggs.
6. Three dimes and 5 cents are —— cents.
7. The area of an oblong 5 inches by 7 inches is —— square inches.

Two apples × 5 =	5 times 2 are ——.
Three feet × 5 =	5 times 3 are ——.
Four chairs × 5 =	5 times 4 are ——.
Five dimes × 5 =	5 times 5 are ——.
Six inches × 5 =	5 times 6 are ——.
Seven pints × 5 =	5 times 7 are ——.

15 and 21 =	25 and 21 =
35 and 21 =	45 and 21 =
55 and 21 =	65 and 21 =
75 and 21 =	85 and 21 =

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48 less 21 =	58 less 21 =
64 less 21 =	75 less 21 =
87 less 21 =	92 less 21 =
108 less 21 =	158 less 21 =

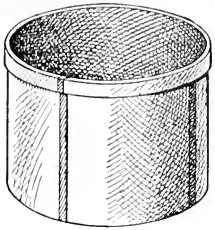
ADD.

a	b	c	d	e	f
24	35	46	37	26	38
32	21	32	52	42	40

g	h	i	j	k	l
25	33	36	42	51	82
32	23	52	34	14	13

SUBTRACT.

m	n	o	p	q	r
86	47	58	65	72	84
21	22	13	23	10	20



1. *One peck is* 8 *quarts.*
   One quart is —— —— of a peck.
2. Two pecks are —— quarts.
   Two quarts are —— —— of a peck.
3. Three pecks are —— quarts.
   Three quarts are —— —— of a peck.
4. Four pecks are —— quarts.

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5. *One bushel is* 4 *pecks.*
   One peck is —— —— of a bushel.
6. Two bushels are —— pecks.
   Two pecks are —— —— of a bushel.
7. Three bushels are —— pecks.
   Three pecks are —— —— of a bushel.
8. Four bushels are —— pecks.

1. A farmer had 250 sheep. He bought 52 more. He then had —— sheep.

250 sheep + 52 sheep =

2. Arthur had $1.50. He spent 25 cents. He then had ——.

$1.50 less 25¢ =

3. Harris had $2.10. His brother had 2 times as much money. His brother had ——.

$2.10 × 2 =

4. A man paid $4.00 for tickets that cost 50¢ each. He bought —— tickets.

$4.00 ÷ 50¢ = $\qquad$ $4 \div \frac{1}{2} =$

5. Mr. Davis paid $600 for 3 acres of land. One acre cost —— dollars.

$600 ÷ 3 =

6. Thirty-five quarts are 8 gallons and —— quarts.

7. Thirty-five days are —— weeks.

8. Thirty-five cents are 3 dimes and —— cents.

9. Thirty-five inches are 2 feet and —— inches.

10. Thirty-five square inches are equal to an oblong 5 inches by —— inches.

35 sq. in. ÷ 7 sq. in. =

6 times 6 stars are —— stars.

The area—

1. Of a 3-inch square is —— square inches.
2. Of a 4-inch square is —— square inches.
3. Of a 5-inch square is —— square inches.
4. Of a 6-inch square is —— square inches.

The perimeter—

5. Of a 3-inch square is —— inches.
6. Of a 4-inch square is —— inches.
7. Of a 5-inch square is —— inches.
8. Of a 6-inch square is —— inches.

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6 times 3 are ——. 6 times 5 are ——.

6 times 4 are ——. 6 times 6 are ——.

ADD.

a	b	c	d	e	f	g
25	35	45	55	35	45	55
25	25	25	25	45	45	15

h	i	j	k	l	m	n
34	34	44	54	74	64	74
26	36	26	16	16	26	16

SUBTRACT.

a	b	c	d	e	f	g
84	63	92	75	86	57	54
24	23	32	25	36	17	24

h	i	j	k	l	m	n
80	70	60	30	50	90	40
9	8	5	6	7	4	6

o	p	q	r	s	t	u
20	30	40	50	60	70	90
4	1	3	6	3	5	6

Two apples × 7 = 7 times 2 are ——.

Three feet × 7 = 7 times 3 are ——.

Four chairs × 7 = 7 times 4 are ——.

ADD.

a	b	c	d	e	f	g
25	24	33	28	69	45	34
6	8	8	4	2	7	8

h	i	j	k	l	m	n
63	46	34	42	55	74	66
7	6	8	9	6	8	6

SUBTRACT.

a	b	c	d	e	f	g
81	81	81	81	81	81	81
1	2	4	3	5	7	6

h	i	j	k	l	m	n
81	81	81	81	81	81	81
9	8	10	11	12	14	13

MULTIPLY.

a	b	c	d	e	f	g
22	32	43	34	24	23	33
2	2	2	2	2	2	2

Two apples × 8 = 8 times 2 are ——.

Three feet × 8 = 8 times 3 are ——.

Four chairs × 8 = 8 times 4 are ——.

ADD.

a	b	c	d	e	f	g
24	36	55	63	44	27	38
28	46	26	18	48	25	24

SUBTRACT.

a	b	c	d	e	f	g
42	42	42	42	42	42	42
12	13	15	14	16	17	18

MULTIPLY.

a	b	c	d	e	f	g
25	35	45	25	15	15	26
2	2	2	3	3	4	2

Two apples × 9 = 9 times 2 are =

Three feet × 9 = 9 times 3 are =

DIVIDE. I.

a	b	c
2 ft.) 12 ft.	2 ft.) 22 ft.	2 ft.) 48 ft.

DIVIDE. II.

a	b	c
2) 12 ft.	2) 22 ft.	2) 48 ft.