's

FIRST LESSONS

NUMBERS.

NEW-YORK:
RPER & BROTHERS.

FRENCH'S

FIRST LESSONS

IN

NUMBERS.

NEW-YORK:

HARPER & BROTHERS.

COUNTERS, AND COUNTING-BOARDS.

EVERY primary school-room should be supplied with a variety of kinds of objects, and an abundance of each kind, to be used by the pupils in learning arithmetical combinations. For this purpose, walnuts, horse-chestnuts or buckeyes, pebbles, sea-shells, large flat beans, blocks of wood, etc., may be used.

A counting-board adds very much to the convenience of both pupils and teacher. This may be of any convenient length, about one foot in width if placed against the wall, and from two to three feet wide if standing away from it, and about two feet high. To prevent the counters from falling off, the edge should be raised a half inch or more by a thin strip of board, and the top should be divided into sections of about one foot in length, and from eight to twelve inches wide, by strips of lath or board. (*See picture and diagrams above.*) When a counting-board can not be had, a table or flat desk may be used in stead.

FRENCH'S MATHEMATICAL SERIES.

FIRST LESSONS IN NUMBERS;

IN THE NATURAL ORDER:

FIRST, VISIBLE OBJECTS;
SECOND, CONCRETE NUMBERS;
THIRD, ABSTRACT NUMBERS.

BY
JOHN H. FRENCH, LL.D.

NEW YORK:
HARPER & BROTHERS.
1872.

PUBLISHERS' NOTICE.

FRENCH'S ARITHMETICS.

This Series consists of Five Books, viz.:

I.—FIRST LESSONS IN NUMBERS.
II.—ELEMENTARY ARITHMETIC.
III.—MENTAL ARITHMETIC.
IV.—COMMON SCHOOL ARITHMETIC.
V.—ACADEMIC ARITHMETIC.....In Preparation.

The Publishers present this Series of Text-Books to American Teachers, fully believing that they contain many new and valuable features that will especially commend them to the *practical* wants of the age.

The plan for the Series, and for each book embraced in it, was fully matured before any one of the Series was completed; and as it is based upon true philosophical principles, there is a harmony, a fitness, and a real progressiveness in the books, that is not found in any other Series of Arithmetics published.

PREFACE.

THIS little book is intended to give to young children clear ideas of the elementary combinations of numbers, and some practical knowledge of their applications to the business affairs of life. As its general plan is unlike other works designed for the same grade of learners, it is important that teachers and parents should make themselves familiar with its peculiar characteristics, before using it in classes or families.

General Divisions.—Sections.—The book is divided into fifteen sections, the first one of which is devoted to lessons in counting; the next eight to examples and combinations in Addition, Subtraction, Multiplication, and Division; the next three to the fractional parts of numbers—halves, thirds, and fourths; the thirteenth to miscellaneous problems, embracing all the classes of combinations in the preceding sections; the fourteenth section to tables of the denominations of money, weight and measures in common use; and the fifteenth to combinations embracing the tables of Addition, Subtraction, Multiplication, Division, Factors, and Aliquot or Fractional Parts.

Articles.—The division of the sections into articles indicates, in every case, either a new class of combinations, or a review of combinations already learned. For example, Section III, as its title states, teaches "Addition and Subtraction, with the numbers 4, 5, 6, as one of the parts or terms." Article A contains combinations in Addition and Subtraction, with 4 as one of the parts or terms; Article B, with 5; and Article C, with 6, as one of the parts or terms. Articles D and E are reviews of *all* the combinations in the three preceding articles, the numbers being concrete, and some of them perceptive; while the questions in Article D require the briefest form of answer.

Tables of Money, Weight, and Measures.—These tables, pages 97–99, contain only the tables and denominations in common use. The stereotyped schoolmaster and school-book-maker arrangement has been discarded, and the denominations are here presented as they are used in business.

Tables of Combinations.—In Section XV these tables are arranged to be learned in the same order as they are developed in the previous sections. Thus, page 101, the Addition and Subtraction tables of the number 3 are so arranged that when the child has completed Section II, Article C, in which he learns to add 3 to any number not exceeding 10, and to subtract with 3 as one of the terms, he can turn to this part of the book, and first learn the Addition, and then the Subtraction table of 3; after which he is to recite the two tables across the page, making the converse combinations upon the same

set of numbers. The same arrangement is observed in the Multiplication and Division tables. The Factor table, if thoroughly learned, can not fail to secure the promptness and accuracy so much to be desired, yet so seldom acquired in Division; and the table of Aliquot or Fractional Parts will make the child familiar with the fractional forms of expression so often used in Division. The two tables last named are here published for the first time; but they have been subjected to thorough tests in the school-room, and are found to be very valuable.

Converse Combinations.—Converse or opposite combinations of the same numbers are embraced in the same section, throughout the work, and in many cases in the same article. Thus, in Section II, the child learns to add with 1, 2, or 3 as one of the parts, and to subtract with the same numbers as one of the terms; in Section VI he learns to multiply with 2 or 3 as one factor, and to divide with each of the same numbers as one of the terms; in Section X he learns how to find one half when the whole is given, and how to find the whole when one half is given; and so on, through the first twelve sections.

Natural Order of Mental Development.—All the combinations embraced in the tables, pages 100, 107, have been used in the previous sections of the book at least three times, and are presented, successively, in the natural order: first, Visible Objects; second, Concrete Numbers; third, Abstract Numbers. Every new combination is introduced either in connection with the *picture* of an object, or with the *name* of some object familiar to the pupil, and which the teacher, in many cases, may be able to place before him. The second time the combinations are used, they are associated with the names of familiar objects not in sight; and the third time they are made with abstract numbers. Thus the law of the natural order of mental development, viz., first, Perception (Visible Objects); second, Conception (Concrete Numbers); third, Abstraction (Abstract Numbers), is strictly observed. All the problems and examples in smaller type contain combinations that have already been used once or more.

Illustrations and Examples.—The cuts are not mere counters, picked up at random; but are pictures which will cultivate the taste of the child, and impart useful knowledge, besides assisting him in his first steps in numbers; and the examples contain much valuable information upon the various occupations, trades, and branches of business, that can not fail to enlist the interest of children in the study of the book.

Manual for Teachers.—All forms of answer and solution, remarks, notes, etc., have been omitted from the body of the work, and are presented in the last thirteen pages, in the form of hints and suggestions, as a Reference Manual for teachers. They are not intended as arbitrary directions and rules; but are to be adopted, adapted, or rejected, according to circumstances.

FIRST LESSONS IN NUMBERS.

SECTION I.

Exercises in Counting.

A. 1. If I hold up my right hand, as you see in this picture, how many fingers do I hold up?

2. How many thumbs on your right hand?

3. How many on your left hand? How many on both hands?

4. Hold up one finger. Hold up two fingers.

5. Hold up your left hand with the thumb and first finger closed. How many fingers are open?

6. How many fingers on your right hand?

7. Count the thumb with the fingers of your right hand. How many are there in all?

8. If you count the fingers and thumb of your right hand, and the thumb of your left hand, how many will there be?

9. Close the thumb and forefinger of your left hand, and the thumb of your right hand. How many of your fingers are open?

10. How many fingers have you on both hands?

11. Hold up all your fingers and one thumb. How many are there?

12. How many fingers and thumbs have you on both hands?

13. The thumb is often called a finger. Hold up three fingers; seven fingers; five fingers; nine fingers; no fingers; two fingers; six fingers; ten fingers; four fingers; one finger; eight fingers. (See Manual, pages 108–110.)

B. 1. How many houses do you see in the picture on the next page?

2. How many doors do you see?

3. Count the chimneys. How many are there?

4. In the yard are some ladies and children. Count the ladies. How many are there?

5. How many children in the yard?

6. Count two doors. (Thus: *One door, two doors.*)

7. Count two boys; two girls; two chairs.

8. Count three chimneys. (Thus: *One chimney, two chimneys, three chimneys.*)

9. Count three books; three slates; three knives.

10. Count four boys; four pencils; four hats; four shoes.

11. Count five girls; five hands; five pails; five baskets.

12. On the limbs of a tree are some birds. Count them, and tell me how many birds there are.

13. How many trees do you see in the picture?

14. Count the cows in the road. How many are there?

15. Near the cows are some sheep. Count them, and tell me how many there are.

16. How many posts of the fence can be seen?

17. Count six birds; six tops; six balls; six hoops.

18. Count seven trees; seven marbles; seven windows; seven desks.

19. Count eight cows; eight fingers; eight hands; eight apples.

20. Count nine sheep; nine leaves; nine words; nine pins.

21. Count ten posts; ten children; ten lines in your book; ten pictures.

22. How many horses are in this picture?

23. Count the wagons. How many are there?

24. In the picture are how many men on horseback?

25. Count all the men in the picture. How many are there, and what are they doing?

26. Some dogs are barking at some pigs. How many dogs are there?

27. How many pigs are there?

28. We can see some windows in the end of the house, and some in the front; count them. How many windows in all?

29. How many wheels has one wagon? How many have two wagons?

30. How many geese can you see in the picture, and what are they doing?

31. In the picture are some goats. How many of them are lying down? How many are standing? How many goats in all?

32. Count two. (Thus: *One, two.*)

33. Count three, and back again. (Thus: *One, two, three; three, two, one.*)

34. In the same manner, count four and back again. Count five. Six. Seven. Eight. Nine. Ten. (See Manual, page 110.)

SECTION II.

Addition and Subtraction, with the Numbers 1, 2, 3, as one of the parts or terms.

(See Manual, page 111.)

A. 1. How many girls are in this picture?

2. One girl and one girl are how many girls?

3. Ella had one letter block in her hand, but she has just put it upon the chair. How many blocks has she now in her hand?

4. One block from one block leaves how many blocks?

5. If one of the two girls should go out of the room, how many girls would remain?

6. One girl from two girls leaves how many girls?

7. Two kittens are playing on the floor, and one kitten is on a chair. How many kittens are in the picture?

8. How many more kittens are on the floor than on the chair?

9. In the room are three chairs, and one of them is an arm-chair. How many of the chairs are without arms? (See Manual, page 112.)

10. Three balls are lying on the floor near the table, and a kitten is playing with one ball under a chair. How many balls are on the floor?

11. On the table are four books in a pile, and one book lying by itself. If I should take away one of the four books, how many books would be left in the pile?

12. How many books are four books and one book?

13. One book from five books leaves how many books?

14. Four books from five books leave how many books?

15. Ella has five letter blocks on the floor, and one upon the chair. How many blocks has she?

16. If Ella should give one of her blocks to Clara, how many would she have left?

17. Six cherries and one cherry are how many cherries?

18. One cherry from seven cherries leaves how many cherries?

19. Six cherries from seven cherries leave how many cherries?

20. How many strawberries are seven strawberries and one strawberry?

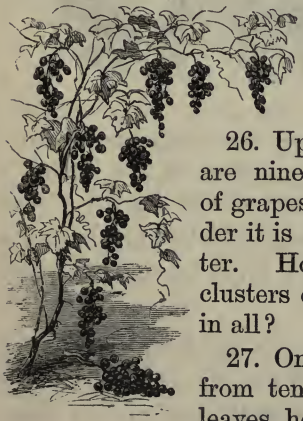
21. One strawberry from eight strawberries leaves how many strawberries?

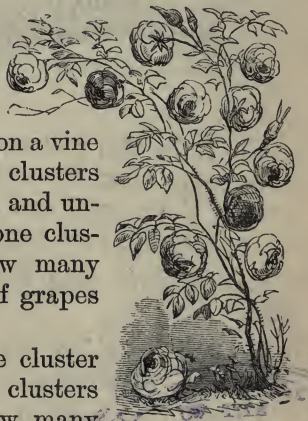
22. If you have eight strawberries, and eat seven of them, how many of them will you have left?

23. Eight peaches and one peach are how many peaches?

24. One peach from nine peaches leaves how many peaches?

25. Eight peaches from nine peaches leave how many peaches?





26. Upon a vine are nine clusters of grapes, and under it is one cluster. How many clusters of grapes in all?

27. One cluster from ten clusters leaves how many clusters?

28. Nine clusters from ten clusters leave how many clusters?

29. Ten roses and one rose are how many roses?

30. One rose from eleven roses leaves how many roses?

31. Ten roses from eleven roses leave how many roses?

B. 1. In this picture we see some boys sailing little boats upon the water. Two of the boys are on the shore, and one boy stands in the water. How many boys are two boys and one boy?

2. Two boys from three boys leave how many boys?

3. On the bridge are two boys and two girls. How many children are on the bridge?

4. If two girls should go off the bridge, how many girls would remain on the bridge?

5. On the bridge are four children, two of whom are girls. How many are boys?

6. Two boys are fishing, and three are sailing boats. How many boys in all?

7. If two of the boys should go home, how many boys would remain?

8. Four boats are sailing on the stream, and the boys have two in their hands. Four boats and two boats are how many boats?

9. Two boats from six boats leave how many boats?

10. Five children and two children are how many children?

11. Seven children are how many more than two children?

12. How many trees are six trees and two trees?

13. Eight trees are how many more than two trees?

14. Seven pinks and two pinks are how many pinks?

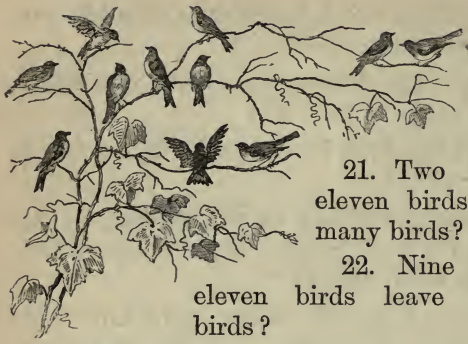
15. Two pinks from nine pinks leave how many pinks?

16. Seven pinks from nine pinks leave how many pinks?

17. How many acorns are eight acorns and two acorns?

18. Two acorns from ten acorns leave how many acorns?

19. Eight acorns from ten acorns leave how many acorns?



20. How many birds are two birds and nine birds?

21. Two birds from eleven birds leave how many birds?

22. Nine birds from eleven birds leave how many birds?

23. How many leaves are ten leaves and two leaves? Two leaves and ten leaves?

24. Twelve leaves are how many more than two leaves?

25. Twelve leaves are how many more than ten leaves?

C. 1. How many deer are three deer and three deer?

2. Three deer are standing, and three are lying down. How many more are standing than are lying down?

3. Three deer from six deer leave how many deer?

4. Four rabbits and three rabbits are how many rabbits?

5. Three rabbits from seven rabbits leave how many rabbits?

6. Four rabbits from seven rabbits leave how many rabbits?

7. How many chickens are five chickens and three chickens?

8. Three chickens from eight chickens leave how many chickens?

9. Five chickens from eight chickens leave how many chickens?

10. Six windows and three windows are how many windows?

11. Nine windows are how many more than three windows?

12. Nine windows are how many more than six windows?

13. Seven trees and three trees are how many trees?

14. Ten trees are how many more than three trees?

15. Ten trees are how many more than seven trees?

16. Eight swallows and three swallows are how many swallows?

17. Three swallows from eleven swallows leave how many swallows?

18. Eight swallows from eleven swallows leave how many swallows?

19. How many ducks are nine ducks and three ducks?

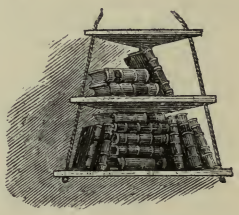
20. Three ducks from twelve ducks leave how many ducks?

21. Nine ducks from twelve ducks leave how many ducks?

22. Ten books and three books are how many books?

23. Three books from thirteen books leave how many books?

24. Ten books from thirteen books leave how many books?



D. How many are

1. One pen and five pens?
2. One top and eight tops?
3. Two caps and six caps?
4. Three bells and six bells?
5. One cup and seven cups?
6. One bird and ten birds?
7. Three guns and nine guns?
8. Two pins and eight pins?
9. Three pinks and seven pinks?
10. Two boots and ten boots?
11. One map and nine maps?
12. Three wheels and ten wheels?
13. Two plums and seven plums?
14. One book and six books?
15. Two slates and nine slates?
16. Three plates and eight plates?
17. Three chairs and five chairs?

How many will remain, if you take

18. Two hats from two hats?
19. Two sleds from eight sleds?
20. Two flags from ten flags?
21. Three keys from ten keys?
22. One egg from nine eggs?
23. One knife from eight knives?
24. One fig from eleven figs?
25. Three trees from nine trees?
26. Three shoes from twelve shoes?
27. Two clocks from twelve clocks?
28. One drum from ten drums?
29. Three pears from thirteen pears?
30. Two balls from five balls?
31. Three clubs from seven clubs?
32. Three flies from eleven flies?
33. Two pails from nine pails?
34. One pan from seven pans?
35. Two forks from eleven forks?
36. Three spoons from eight spoons?

(See Manual, page 112.)

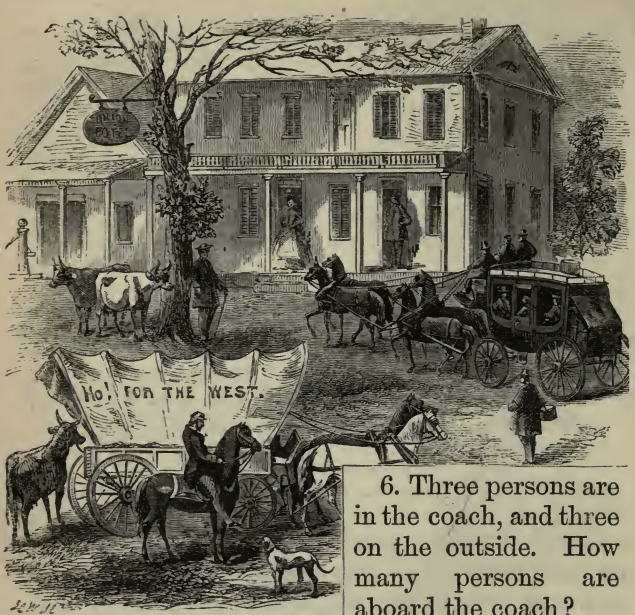
E. 1. In the picture on the next page are two cows by the tree in front of a country tavern, and one cow behind an emigrant wagon. How many cows are two cows and one cow?

2. Before the stage-coach are two two-horse teams. Two horses and two horses are how many horses?

3. In the end of the tavern are three windows in the upper story, and two windows in the lower story. How many windows in the end of the house?

4. Three windows are how many more than two windows?

5. Two windows are how many less than five windows?



6. Three persons are in the coach, and three on the outside. How many persons are aboard the coach?

7. How many more persons are in the coach than are on the outside?

8. One of the persons on the outside is the driver. How many passengers are on the outside? How many are aboard the coach?

9. We can see three doors in the lower story of the house, and one door in the upper story. How many doors of the house can we see?

10. Before the stage-coach are four horses, and before the emigrant wagon two horses. How many horses are four horses and two horses? Four horses and one horse? Five horses and two

horses? Four horses and two horses and one horse? Four horses and three horses?

11. Two horses from six horses leave how many horses? Two horses from four horses? Four horses from six horses?

12. How many windows are three windows and five windows?

13. Three windows are how many less than five windows? How many less than eight windows?

14. Eight windows are how many more than five windows?

15. One person is on horseback, and six persons are aboard the coach. How many persons are riding?

16. Three persons are how many less than six persons?

17. One horse from seven horses leaves how many horses?

18. Six horses from seven horses leave how many horses?

19. On the piazza are two persons, and in other parts of the picture nine persons. How many persons are in the picture?

20. Eight persons are how many less than eleven persons?

21. Two horses from seven horses leave how many horses?

22. Three horses from seven horses leave how many horses?

23. How many persons are six persons and two persons and one person and two persons?

SECTION III.

Addition and Subtraction, with the Numbers 4, 5, 6, as one of the parts or terms.

(See Manual, page 112.)

A. Here is a picture of some boys playing soldier. They are in two companies. You may count the boys in each company. How many boys in the smaller company? How many in the larger?

1. Four boys of one company are standing, and three are sitting. How many boys in that company?

2. How many more boys are standing than are sitting?

3. How many more boys in the larger company than in the smaller?

4. Of the company of seven boys, three are sitting. How many are standing?

5. Four boys of each company are standing. How many boys of both companies are standing?

6. How many more boys of one company are standing than of the other?

7. If four more boys should sit down, how many would be left standing?

8. Five boys of one company and four of the other have wooden guns. Five guns and four guns are how many guns?

9. Five guns are how many more than four guns?

10. Four guns from nine guns leave how many guns?

11. Five guns from nine guns leave how many guns?

12. Six boys of one company and four of the other have paper caps. Six caps and four caps are how many caps?

13. Six caps are how many more than four caps?

14. Four caps from ten caps leave how many caps?

15. Six caps from ten caps leave how many caps?

16. How many boys in both companies?

17. How many more boys in the larger company than in the smaller?

18. Four boys from eleven boys leave how many boys?

19. Seven boys from eleven boys leave how many boys?

20. How many feet have two horses? How many feet have two horses and a colt?

21. Eight feet are how many more than four feet?

22. Four feet from twelve feet leave how many feet?

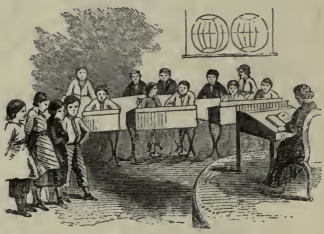
23. Eight feet from twelve feet leave how many feet?

24. Nine barrels and four barrels are how many barrels?

25. Nine barrels are how many more than four barrels?

26. Four barrels from thirteen barrels leave how many barrels?

27. Nine barrels from thirteen barrels leave how many barrels?



28. In this picture count the pupils in the class. Count those at their seats. How many pupils in the schoolroom?

29. How many more pupils are at their seats than are in the class?

30. Four pupils from fourteen pupils leave how many pupils?

31. Ten pupils from fourteen pupils leave how many pupils?

B. 1. Five bags and five bags are how many bags?

2. Five bags are how many more than five bags?

3. Five bags from ten bags leave how many bags?

4. How many doves are six doves and five doves?

5. Six doves are how many more than five doves?

6. Five doves from eleven doves leave how many doves?

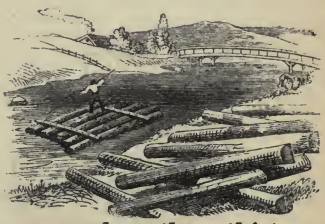
7. Six doves from eleven doves leave how many doves?

8. Seven sheep are standing in a field, and five are lying down. How many sheep in the field?

9. How many more sheep are standing than are lying down?

10. Five sheep from twelve sheep leave how many sheep?

11. Seven sheep from twelve sheep leave how many sheep?



12. On the land are eight saw logs, and in the water are five. How many logs in all?

13. How many more are on the land than in the water?

14. Five logs are how many less than thirteen logs?

15. Eight logs are how many less than thirteen logs? (See Manual, page 112.)

16. Nine geese and five geese are how many geese?

17. Nine geese are how many more than five geese?

18. Five geese from fourteen geese leave how many geese?

19. Nine geese from fourteen geese leave how many geese?

20. How many are ten bricks and five bricks?

21. Ten bricks are how many more than five bricks?

22. Five bricks from fifteen bricks leave how many bricks?

23. Ten bricks from fifteen bricks leave how many bricks?

C. 1. Count all the persons in the picture on the next page. How many are there? How many are in the farther group?

2. The six boys of one party and also six of the other party are skating. How many boys are skating?

3. How many more boys are skating in one place than in the other?

4. Twelve boys are how many more than six boys?

5. There are seven boys on skates in one party, and six in the other. How many boys are on skates?

6. Seven boys are how many more than six boys?

7. Six boys from thirteen boys leave how many boys?

8. Seven boys from thirteen boys leave how many boys?

9. Eight children and six children are how many children?

10. Eight children are how many more than six children?

11. Six children from fourteen children leave how many children?

12. Eight children from fourteen children leave how many children?

13. There are nine persons in one group, and six in the other. How many persons in both groups?

14. How many more persons in one group than in the other?

15. Fifteen persons are how many more than six persons? How many more than nine persons?

16. George bought a cent's worth of chestnuts, and after giving six of them to Alice, he had ten left. How many chestnuts did he buy?

17. How many more had George than Alice?

18. Six chestnuts from sixteen chestnuts leave how many chestnuts?

19. Ten chestnuts from sixteen chestnuts leave how many chestnuts? (See Manual, page 112.)

D. How many are

1. Four cents and seven cents?
2. Four hens and ten hens?
3. Five axes and eight axes?
4. Six leaves and eight leaves?
5. Five lambs and seven lambs?
6. Six sheep and nine sheep?
7. Four dolls and eight dolls?
8. Four muffs and nine muffs?
9. Five bags and nine bags?
10. Five colts and six colts?
11. Six jugs and seven jugs?

How many will remain, if you take

12. Seven lamps from eleven lamps?
13. Five nails from fourteen nails?
14. Six skates from eleven skates?
15. Six hooks from twelve hooks?
16. Five flags from eleven flags?
17. Ten kites from fifteen kites?
18. Six brooms from fourteen brooms?
19. Nine stools from fifteen stools?
20. Four saws from thirteen saws?
21. Eight combs from twelve combs?
22. Five boxes from nine boxes?
23. Eight cakes from thirteen cakes?
24. Six tacks from sixteen tacks?
25. Ten hoops from sixteen hoops?
26. Six jars from thirteen jars?
27. Five tubs from fifteen tubs?
28. Eight vests from fourteen vests?

E. 1. In the wagon in front of the cooper shop are six barrels, and on the ground near the wagon are four barrels. Six barrels and four barrels are how many barrels? (See Manual, page 112.)

2. By the cooper shop are six barrels in a pile. Six barrels and six barrels are how many barrels?

3. How many more barrels are on the wagon than in the pile?

4. On the ground and by the cooper shop are ten barrels, and in the wagon are six barrels. How many barrels in all?

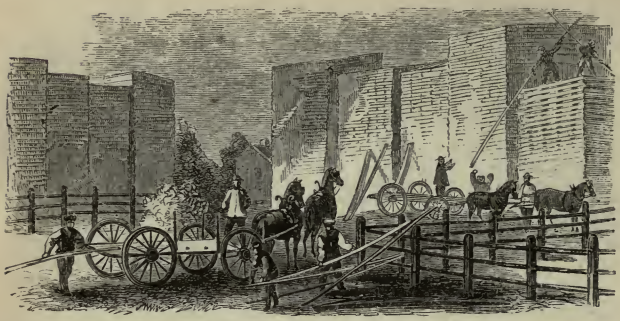
5. How many more barrels are on the ground and in the pile than in the wagon?

6. How many wheels have two wagons?

7. Eight wheels are how many more than four wheels?

8. In a lumber yard five men are at work in one place, and four men in another place. Five men and four men are how many men?

9. A cooper has five piles of staves in one place, and five piles in another. How many piles of staves has he?



10. If he uses five piles of these staves in making barrels, how many piles will he have left?

11. Four men are how many less than nine men?

12. In one fence near the lumber yard we can see ten posts, and in another fence we can see four posts. How many fence posts can we see in the picture?

13. On one side of the cooper shop are seven trees, and on the other side are five trees. How many trees in the picture?

14. Ten posts are how many more than four posts?

15. Four posts from fourteen posts leave how many posts?

16. Ten posts from fourteen posts leave how many posts?

17. Twelve trees are how many more than seven trees?

18. Five trees from twelve trees leave how many trees?

19. Charles has six marbles, and Harry has nine. How many marbles have the two boys?

20. Flora made ten pin cushions for Christmas presents, and Fanny made five. How many did they both make?

21. Ellen's father gave her fourteen cents, and she paid nine cents of the money for a doll. How many cents had she left?

22. In a reading class of thirteen pupils, seven are boys. How many are girls?

23. Lewis brought thirteen peaches from the garden, and gave five of them to his sister. How many had he left?

24. How many more had he than his sister?

25. A farmer, having fifteen turkeys, sold six of them. How many had he left?

26. On one side of a street are seven houses, and on the other side are five houses. How many houses on both sides of the street?

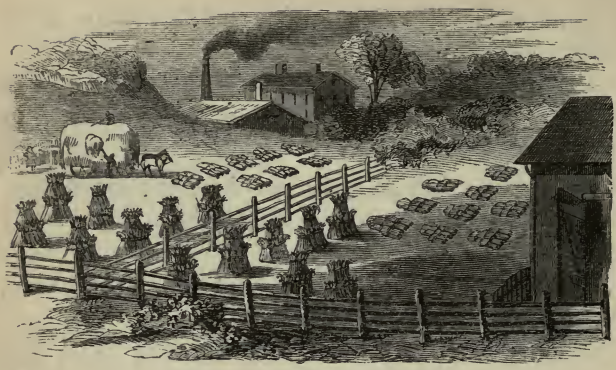
27. How many more on one side of the street than on the other?

28. In one family are six persons, and in another family are ten persons. How many persons in the two families?

29. Count eleven, and back again. (Thus: *One, two, three, four, five, six, seven, eight, nine, ten, eleven; eleven, ten, nine, eight, seven, six, five, four, three, two, one.*)

30. In the same manner count twelve; thirteen; fourteen; fifteen; sixteen; seventeen; eighteen; nineteen; twenty.

(See Manual, pages 110, 112.)



SECTION IV.

Addition and Subtraction, with the Numbers 7, 8, 9, 10, as one of the parts or terms.

A. 1. Seven shocks of grain are standing in one harvest field, and seven shocks in another. How many shocks are standing in both fields?

2. Seven loads of wheat from fourteen loads leave how many loads?

3. In one field seven shocks of grain are standing, and eight shocks are down. How many shocks of grain are in that field?

4. Seven bundles of oats from fifteen bundles leave how many bundles?

5. Eight sheaves of rye from fifteen sheaves leave how many sheaves?

6. In the other field seven shocks are standing, and nine shocks are down. How many shocks of grain in that field?

7. Seven shocks of barley from sixteen shocks leave how many shocks?

8. If nine loads of straw be taken from a stack containing sixteen loads, how many loads will be left in the stack?

9. We can see seven lengths of fence between the two fields, and ten lengths on the road. How many lengths of the two fences are shown in the picture?

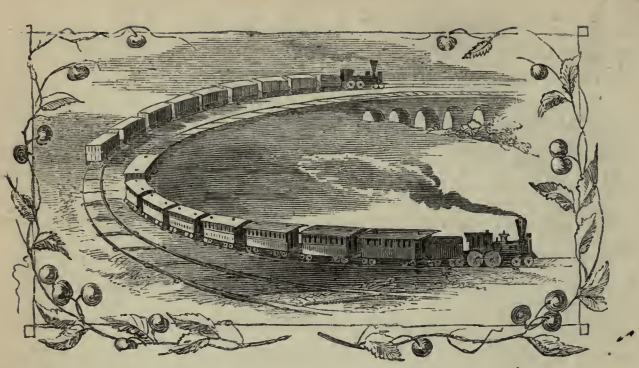
10. Seven rails from seventeen rails leave how many rails?

11. Ten boards from seventeen boards leave how many boards? (See Manual, page 112.)

B. Numbers may be expressed by words, figures, or capital letters. (See page 4 of cover; also Manual, page 112.)

In the following table the first ten numbers are expressed in all these ways:

By Words.			By Figures.			By Letters.	
Roman type.	Italic type.	Script type.	Roman type.	Italic type.	Script type.	Roman type.	Italic type.
One.	*One.*	*One.*	1	*1*	*1*	I	*I*
Two.	*Two.*	*Two.*	2	*2*	*2*	II	*II*
Three.	*Three.*	*Three.*	3	*3*	*3*	III	*III*
Four.	*Four.*	*Four.*	4	*4*	*4*	IV	*IV*
Five.	*Five.*	*Five.*	5	*5*	*5*	V	*V*
Six.	*Six.*	*Six.*	6	*6*	*6*	VI	*VI*
Seven.	*Seven.*	*Seven.*	7	*7*	*7*	VII	*VII*
Eight.	*Eight.*	*Eight.*	8	*8*	*8*	VIII	*VIII*
Nine.	*Nine.*	*Nine.*	9	*9*	*9*	IX	*IX*
Ten.	*Ten.*	*Ten.*	10	*10*	*10*	X	*X*



C. 1. In one of these railroad trains are 8 passenger cars, and in the other are 8 freight cars. How many cars in the two trains?

2. How many more cars in the passenger train than in the freight train?

3. Sixteen cars are how many more than eight cars?

4. On one branch are 8 cherries, and on another branch are 9. How many cherries on both branches?

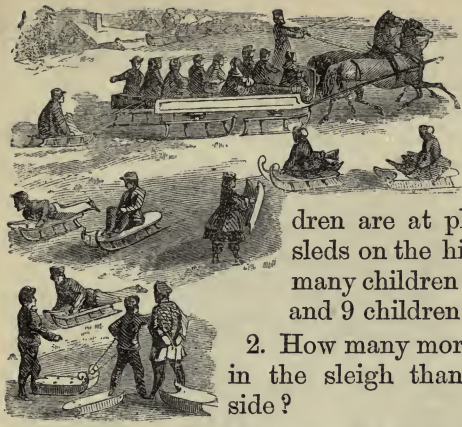
5. If you take eight cherries from seventeen cherries, how many cherries will be left?

6. Take nine cherries from seventeen cherries. How many are left?

7. On one branch are 10 leaves, and on another are 8 leaves. How many leaves are on the two branches?

8. From eighteen leaves take eight leaves. How many leaves remain?

9. Eighteen leaves are how many more than ten leaves?



D. 1. In this picture 9 children are riding in a sleigh, and 9 other children are at play with their sleds on the hill-side. How many children are 9 children and 9 children?

2. How many more children are in the sleigh than on the hill-side?

3. Eighteen children are how many more than nine children?

4. In the picture 10 children have sleds. How many children are 10 children and 9 children?

5. Ten children are how many more than nine children?

6. In this picture are nineteen children. If nine of them go home, how many will remain?

7. If ten of them go home, how many will remain?

8. How many persons are in the sleigh? How many persons are 10 persons and 10 persons?

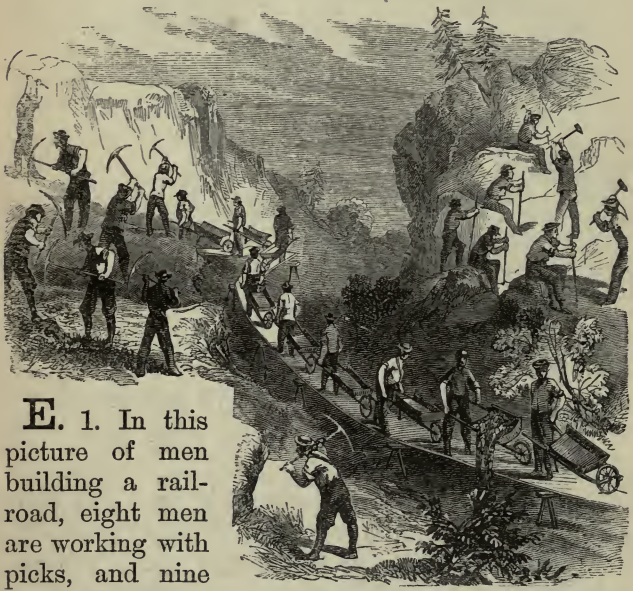
9. Ten sleds from ten sleds leave how many sleds?

10. Twenty persons are how many more than ten persons?

11. Nine sleds and eight sleds are how many sleds?

12. Nine muffs are how many less than sixteen muffs?

13. Three children have fur mittens, five have leather mittens, and seven have yarn mittens. How many children have mittens?



E. 1. In this picture of men building a railroad, eight men are working with picks, and nine men with wheelbarrows. How many men are using picks and wheelbarrows?

2. Seven men are drilling rock for blasting, and breaking it in pieces. How many men are at work with picks and at the rock?

3. How many men are at work with wheelbarrows and at the rock?

4. How many more men are using picks and wheelbarrows than are working at the rock?

5. How many more men are working at the rock and with picks than are using wheelbarrows?

6. How many more men are working at the rock and with wheelbarrows than with picks?

F. How many are

1. 7 shovels and 7 shovels?
2. 8 loads and 8 loads?
3. 10 crow-bars and 10 crow-bars?
4. 10 pipes and 10 pipes?
5. 8 saddles and 10 saddles?
6. 7 bridles and 10 bridles?
7. 9 halters and 9 halters?

How many will remain, if you take

8. Seven picks from sixteen picks?
9. Eight spades from seventeen spades?
10. Seven rails from fourteen rails?
11. Nine stumps from nineteen stumps?
12. Seven spikes from fifteen spikes?
13. Nine rocks from sixteen rocks?
14. Ten kegs from seventeen kegs?
15. Eight cars from eighteen cars?
16. Eight boats from fifteen boats?
17. Nine whips from seventeen whips?
18. Ten hubs from nineteen hubs?
19. Ten seats from eighteen seats?
20. Ten stages from twenty stages?
21. Nine travelers from eighteen travelers?
22. Write in figures the numbers expressed by these letters: V, VIII, II, IV.
23. Express by letters the numbers 1, 6, 10, 3, 7, 9.
24. Write the first ten numbers in words, figures, and letters.

(See Manual, page 112.)

SECTION V.

Miscellaneous Exercises in Addition and Subtraction. (See Manual, page 112.)

A. 1. Maria has 7 peaches, and Mary has 6. How many peaches have the two girls?

2. How many are 7 and 6?

3. Edward, having thirteen cherries, gave five of them to Emma. How many had he then?

4. Five from thirteen leave how many?

5. Henry paid 10 cents for a speller, and 8 cents for a slate? How many cents did he pay for both?

6. How many are 10 and 8? 8 and 10?

7. Sarah gave her teacher 8 roses, and Ida gave her 7. How many roses did they both give her?

8. How many are 8 and 7? 7 and 8?

9. Thirteen boys were at play in the yard, but nine of them have gone into the school-house. How many of them remain in the yard?

10. Take nine from thirteen, and how many will be left?

11. Richard had eleven rabbits, but he gave six of them to his cousin Robert. How many rabbits did he keep?

12. Take six from eleven, and how many will be left?

13. In going through the woods, William saw 9 red squirrels and 4 gray ones. How many squirrels did he see?

14. How many are 9 and 4? 4 and 9?

15. Otis had 8 marbles, and he bought 6 more. How many had he then?

16. Rufus brought 10 eggs from the barn one day, and 9 eggs the next day. How many eggs did he bring from the barn in both days?

17. How many are 10 and 9?

18. Martha has 6 birds in one cage, and 4 in another. How many birds has she?

19. 4 and 6 are how many? 6 and 8 are how many?

20. George's father gave him eighteen cents, and he paid ten cents of the money for a rubber ball. How many cents had he left?

21. Ten from eighteen leave how many?

22. In one room are 8 chairs, and in another room are 5. How many chairs in both rooms?

23. How many are 5 and 8? 8 and 5?

24. A cooper made fifteen cider barrels, and sold eight of them. How many had he left?

25. Eight from fifteen leave how many?

26. A merchant has 9 kegs of nails under one counter, and 6 kegs under another. How many kegs of nails has he?

27 How many are 6 and 9? 9 and 6?

28. Nine cows are in one field, and seven are in another. How many cows are in the two fields?

29. How many are 7 and 9? 9 and 7?

30. In the stable were eleven horses, but seven of them have been taken out. How many horses are left in the stable?

31. Seven from eleven leave how many? Four from eleven?

32. In a garden are 9 cherry-trees and 9 plum-trees. How many fruit-trees in the garden?

33. 9 and 9 are how many?

34. Lyman caught fifteen trout, and sold nine of them. How many did he keep?

35. Nine from fifteen leave how many?

36. A fruit peddler bought seventeen oranges, and sold nine of them. How many had he left?

37. Nine from seventeen leave how many?

38. Olive had thirteen letter blocks, but she has lost six of them. How many has she now?

39. Seven from thirteen leave how many?

40. Eliza had sixteen cents, but she spent ten of them for a primer. How many cents had she then?

41. Ten from sixteen leave how many?

42. Jacob found fourteen apples under a tree, and picked up nine of them. How many did he leave on the ground?

43. Nine from fourteen leave how many?

44. From a bush containing fourteen roses, Emily picked eight. How many roses remained on the bush?

45. Eight from fourteen leave how many?

46. A man paid 10 dollars for a stove, and 4 dollars for a load of wood. How many dollars did the stove and wood cost him?

47. Ten boys were playing ball, and six boys were flying kites. How many boys were at play?

48. How many are 10 and 4? 6 and 10?

49. A grocer having nineteen chests of tea, sold nine of them. How many chests had he left?

50. Nine from nineteen leave how many? (Manual, page 113.)

B. We have already learned how to express the first ten numbers by figures. The remainder of the first fifty numbers are expressed in words and figures, as shown on the next page:

By Words.	By Figures.	By Words.	By Figures.	By Words.	By Figures.
Eleven	11 *11*	Twenty-four	24 *24*	Thirty-eight	38 *38*
Twelve	12 *12*	Twenty-five	25 *25*	Thirty-nine	39 *39*
Thirteen	13 *13*	Twenty-six	26 *26*	Forty	40 *40*
Fourteen	14 *14*	Twenty-seven	27 *27*	Forty-one	41 *41*
Fifteen	15 *15*	Twenty-eight	28 *28*	Forty-two	42 *42*
Sixteen	16 *16*	Twenty-nine	29 *29*	Forty-three	43 *43*
Seventeen	17 *17*	Thirty	30 *30*	Forty-four	44 *44*
Eighteen	18 *18*	Thirty-one	31 *31*	Forty-five	45 *45*
Nineteen	19 *19*	Thirty-two	32 *32*	Forty-six	46 *46*
Twenty	20 *20*	Thirty three	33 *33*	Forty-seven	47 *47*
Twenty-one	21 *21*	Thirty-four	34 *34*	Forty-eight	48 *48*
Twenty-two	22 *22*	Thirty-five	35 *35*	Forty-nine	49 *49*
Twenty-three	23 *23*	Thirty-six	36 *36*	Fifty	50 *50*
		Thirty-seven	37 *37*	(See Manual, page 113.)	

C. 1. Count twenty-one and back again. In the same manner count twenty-two; twenty-three; twenty-four; twenty-five; twenty-six; twenty-seven; twenty-eight; twenty-nine; thirty. (See Manual, pages 111, 113,)

2. Count 31 and back again. In the same manner, count 32; 33; 34; 35; 36; 37; 38; 39; 40.

3. Count 41 and back again. In the same manner, count 42; 43; 44; 45; 46; 47; 48; 49; 50.

Read the numbers in the twelve columns below.

(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
21	8	47	36	25	12	1	40	29	5	4	44
33	22	0	48	37	26	13	18	41	30	6	19
45	34	23	10	49	38	27	14	20	42	31	16

Write the following numbers in figures:

(16)	(17)	(18)	(19)
Seventeen,	thirty-four,	thirty-nine,	four,
forty-six,	eleven,	twenty-eight,	forty-three,
thirty-five,	fifty,	fifteen,	thirty-two.

SECTION VI.

Multiplication and Division, with 2 or 3 as one factor or term. (See Manual, page 113.)

A. 1. On the opposite page is a picture of a menagerie going from one town to another. Do you see two camels one behind the other? One camel and one camel are how many camels? Then 2 times 1 camel are how many camels?

2. One of the wagons containing wild beasts is drawn by elephants. Two elephants are harnessed together in one pair, and two in another pair. How many elephants are 2 elephants and 2 elephants? How many elephants are 2 times 2 elephants?

3. On the top of this wagon are two seats, and on each seat are three men. How many men are 3 men and 3 men? How many men are 2 times 3 men?

4. Four men are riding on the elephants, and four men on horseback. How many are 4 men and 4 men? How many are 2 times 4 men?

5. The band wagon has a long seat on each side, and on each seat are five men. How many men are 5 men and 5 men? How many men are 2 times 5 men?

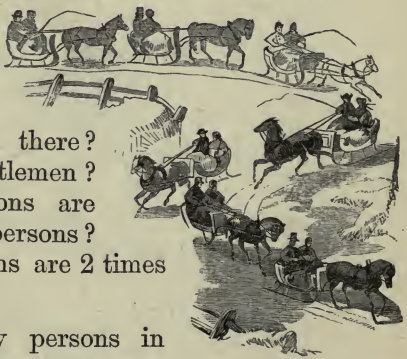
6. The small carriage is drawn by three pairs of ponies. How many ponies are 2 ponies and 2 ponies and 2 ponies? How many ponies are 3 times 2 ponies?

7. The band wagon is drawn by four pairs of horses. How many horses are 2 horses and 2 horses and 2 horses and 2 horses? How many horses are 4 times 2 horses?

8. Each of the five other wagons which contain wild beasts is drawn by two horses. How many horses are 2 horses and 2 horses and 2 horses and 2 horses and 2 horses? How many horses are 5 times 2 horses?

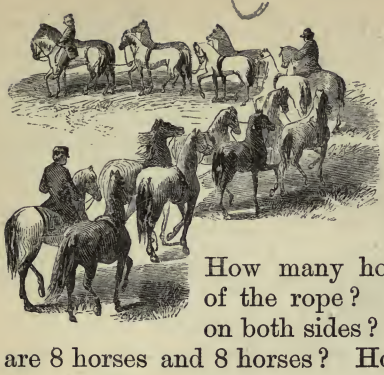
9. In a school-room are 2 seats for classes, and on each seat are 6 pupils. How many pupils are on the 2 seats? How many pupils are 6 pupils and 6 pupils? How many pupils are 2 times 6 pupils?

10. These pupils sit at 6 desks, 2 pupils at each desk. How many pupils are 2 pupils and 2 pupils and 2 pupils and 2 pupils and 2 pupils and 2 pupils? How many pupils are 6 times 2 pupils?



11. Here are some young persons taking a sleigh-ride. How many ladies are there? How many gentlemen? How many persons are 7 persons and 7 persons? How many persons are 2 times 7 persons?

12. How many persons in one sleigh? How many persons in 2 sleighs? In 3 sleighs? In 4 sleighs? In 5 sleighs? In 6 sleighs? In 7 sleighs? How many persons are 7 times 2 persons?



13. These men are taking their horses to the city to sell them. The horses are hitched by pairs to a long rope, as you see in the picture. How many horses on each side of the rope? How many horses on both sides? How many horses are 8 horses and 8 horses? How many horses are 2 times 8 horses?

14. How many pairs of horses are there? How many horses in 1 pair? In 2 pairs? In 3 pairs? In 4 pairs? In 5 pairs? In 6 pairs? In 7 pairs? In 8 pairs? How many horses are 8 times 2 horses?

15. If you have 9 chestnuts in each hand, how many will you have in both hands? How many chestnuts are 2 times 9 chestnuts? (See Manual, page 113.)

16. If each of 9 boys has 2 apples, how many apples have 2 of the boys? How many apples have 3 boys? 5 boys? 9 boys? 9 times 2 apples are how many apples?

17. One boy has 10 fingers. How many fingers have 2 boys? How many fingers are 2 times 10 fingers?

18. One girl has 2 hands. How many hands have 10 girls? How many hands are 10 times 2 hands?

B. 1. Two oxen make one one pair or yoke. How many yoke of oxen are 4 oxen?

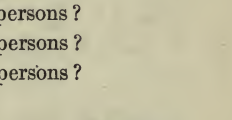
2. 4 oxen are how many times 2 oxen? 4 oxen are 2 times how many oxen?

3. If 6 persons ride in a carriage, and sit 2 on a seat, how many seats will they occupy?

4. How many seats will they occupy if 3 sit on a seat?

5. 6 persons are how many times 2 persons?
6 persons are how many times 3 persons?
6 persons are 3 times how many persons?
6 persons are 2 times how many persons?

6. Eight marbles are how many times two marbles? How many times four marbles?



7. Eight marbles are four times how many marbles? Two times how many marbles?

(See Manual, page 113.)

8. If you pay 2 cents apiece for peaches, how many can you buy for 10 cents?

9. At 5 cents apiece, how many oranges can be bought for 10 cents?

10. 10 cents are

How many times 5 cents?	2 times how many cents?
How many times 2 cents?	5 times how many cents?

11. How many days will 12 eggs last a cook, if she uses 2 eggs each day?

12. How many days will they last her, if she uses 6 eggs a day?

13. 12 eggs are

How many times 6 eggs?	2 times how many eggs?
How many times 2 eggs?	6 times how many eggs?

14. If a tailor earns 2 dollars in one day, how many days will it take him to earn 14 dollars?

15. If a laborer earns 7 dollars in one week, how many weeks must he work to earn 14 dollars?

16. 14 dollars are

How many times 7 dollars?	2 times how many dollars?
How many times 2 dollars?	7 times how many dollars?

17. If you eat 2 apples every day, how many days will 16 apples last you?

18. How many days will 16 figs last you, if you eat 8 figs in a day?

19. 16 pears are

How many times 8 pears?	2 times how many pears?
How many times 2 pears?	8 times how many pears?

20. How many days will it take a boy to learn 18 letters, if he learns 2 letters each day?

21. How many times will 18 melons fill a basket which holds only 9 melons?

22. 18 pins are

How many times 9 pins?	2 times how many pins?
How many times 2 pins?	9 times how many pins?

23. A man who is making maple sugar has a tub that will hold twenty bucketfuls. If he carries two buckets at a time, how many times will he have to bring them full of sap to fill the tub?

24. If he puts 20 bucketfuls into barrels which hold 10 bucketfuls each, how many barrels will he fill?

25. 20 pailfuls of water are

How many times 10 pailfuls?	2 times how many pailfuls?
How many times 2 pailfuls?	10 times how many pailfuls?

(See Manual, page 118.)

C. 1. A ship has 3 masts. How many masts have 2 ships? How many masts have 3 ships? How many masts are 3 masts and 3 masts and 3 masts? How many masts are 3 times 3 masts?

2. How many feet have 3 dogs? How many feet are 4 feet and 4 feet and 4 feet? How many feet are 3 times 4 feet?

3. How many dogs are 3 dogs and 3 dogs and 3 dogs and 3 dogs? 4 times 3 dogs are how many dogs?

4. We see 5 windows in each of these houses. How many windows can we see in the 3 houses? 5 windows and 5 windows and 5 windows are how many windows? How many windows are 3 times 5 windows?

5. How many doors are 3 doors and 3 doors and 3 doors and 3 doors and 3 doors? 5 times 3 doors are how many doors?

6. How many are 3 times 6 soldiers?

(See Manual, page 114.)

7. How many guns are 6 times 3 guns?

8. How many soldiers in 3 squads of 7 soldiers each?

9. How many are
3 times 7 flags?
7 times 3 tents?

10. One passenger car has 8 wheels. How many wheels have 3 passenger cars?

11. At this railroad station are persons in 3 groups, and 9 persons in each group. How many persons are at the station?

12. How many ladies are in 3 cars, if there are 10 ladies in each car?

13. How many are

3 times 8 wheels?	8 times 3 cars?
3 times 9 persons?	9 times 3 trunks?
3 times 10 ladies?	10 times 3 seats?

D. 1. A father divides 9 apples among his children, giving 3 apples to each child. How many children has he?

2. 9 apples are how many times 3 apples? 9 apples are 3 times how many apples.

3. How many boats will be required that 12 boys may take a ride on the river, if 3 boys ride in each boat?

4. If 4 boys should ride in each boat, how many boats would be required?

5. 12 children are

How many times 3 children?	How many times 4 children?
4 times how many children?	3 times how many children?

6. A carman can draw 3 hogsheads of sugar at one load. How many loads will 15 hogsheads make?

7. If 15 hogsheads of sugar be placed in rows of 5 hogsheads each, how many rows will there be?

8. 15 hogsheads of molasses are

How many times 3 hogsheads?	5 times how many hogsheads?
How many times 5 hogsheads?	3 times how many hogsheads?

9. A cutler used 18 blades in making pocket-knives, using 3 blades for each knife. How many knives did he make?

10. If he uses 18 blades, putting 6 blades in each knife, how many knives will he make?

11. 18 pocket-knives are

How many times 3 knives?	6 times how many knives?
How many times 6 knives?	3 times how many knives?

12. One day James picked 21 ripe melons from the vines in his garden, gathering 3 melons from a hill. How many hills of vines had he in his garden?

13. He raised 21 hills of beans, in rows of 7 hills each. How many rows were there?

14. 21 melons are

How many times 3 melons?	7 times how many melons?
How many times 7 melons?	3 times how many melons?

15. Irene gathered 24 flowers, which she arranged in bouquets, putting 8 flowers in each. How many bouquets did she make?

16. 24 roses are

How many times 3 roses?	8 times how many roses?
How many times 8 roses?	3 times how many roses?

17. A man put 27 baskets of apples into barrels, putting 3 basketfuls into each barrel. How many barrels did he fill?

18. He gathered 9 basketfuls from each tree. From how many trees did he gather the apples?

19. 27 baskets are

How many times 3 baskets?	9 times how many baskets?
How many times 9 baskets?	3 times how many baskets?

20. If 3 loads of hay will keep one cow through the winter, how many cows will 30 loads keep?

21. On Christmas morning, Albert found some stems of raisins in his stocking. There were 10 raisins on each stem, and 30 raisins in all. How many stems were there?

22. 30 pictures are

How many times 3 pictures?	10 times how many pictures?
How many times 10 pictures?	3 times how many pictures?

(See Manual, page 114.)

E. 1. Julia has 3 cages, with 2 canary-birds in each cage. How many birds has she?

2. Two boys have five rabbits each. How many rabbits have both boys?

3. John found 3 nests, with 4 eggs in each. How many eggs did he find?

4. At 2 cents apiece, how many peaches can you buy for 4 cents?

5. If a man can earn 2 dollars in one day, how many days will it take him to earn 12 dollars?

6. If you can buy 2 slate-pencils for one cent, how many cents must you pay for 10 pencils?

7. If 7 yards of merino will make a dress, how many yards will be required for 2 dresses?

8. A hardware merchant sold 3 plows, at 7 dollars apiece. How much did he receive for them?

9. There are 6 chairs in a set. How many chairs in 2 sets? How many chairs in 3 sets?

10. Frank paid 24 cents for lemons, at 3 cents apiece. How many lemons did he buy?

11. If school is in session 3 hours each half-day, how many hours of school in 10 half-days?

12. Eugene bought 3 penholders, paying 8 cents for each. How many cents did they cost?

13. Each one of a class of 9 pupils answered 3 questions. How many questions did they all answer?

14. How many boots are there in 10 pairs?

15. Sixteen shoes are how many pairs of shoes?

16. A father gave 30 cents to his children, giving 10 cents to each child. How many children had he?

17. Harriet arranged 27 books in her book-case, putting 9 books on each shelf. How many shelves in her book-case?

18. How many leaves are on 8 stems of clover, there being 3 leaves on each stem?

19. Anna has 2 books, each of which contains 9 pictures. How many pictures in both books?

20. To how many persons can I give 21 oranges, if I give 3 oranges to each person?

21. A man gave 14 apples to some boys, giving 2 apples to each boy. How many boys were there?

22. 18 gloves are how many pairs of gloves?

23. Twenty skates are how many pairs of skates?

24. In 9 pairs of mittens, how many mittens?

25. Ira found 27 chestnuts in burs, each bur containing 3 chestnuts. How many burs were there?

26. If Oscar can write a line in his writing-book in 3 minutes, how many lines can he write in 30 minutes?

27. A man paid 15 dollars for picture-frames, at 3 dollars apiece. How many frames did he buy?

28. How much will 2 sheets of drawing paper cost, at 4 cents a sheet?

29. How many times can you fill a tub which holds 5 pailfuls, from a barrel containing 15 pailfuls?

30. Jay makes 2 pictures in his drawing book each day. How many pictures does he draw in 8 days?

31. At 6 cents a quart, how many quarts of milk can be bought for 12 cents?

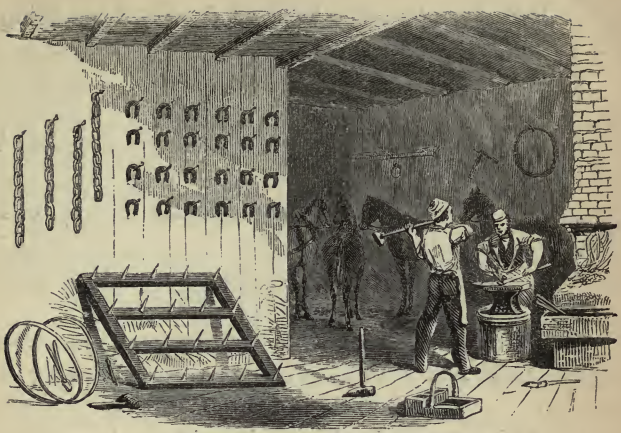
32. How much will 3 boxes of strawberries cost, at 10 cents a box?

33. If one barrel of flour can be made from 4 bushels of wheat, how many barrels can be made from 8 bushels?

34. If a man walks 3 miles in one hour, how many miles can he walk in 6 hours?

35. How many sets of spoons are 18 spoons?

36. A man paid 18 cents for a fresh fish, at 9 cents a pound. How much did the fish weigh?



SECTION VII.

Multiplication and Division, with 4 or 5 as one factor or term. (See Manual, page 114.)

A. 1. How many horseshoes will it take to shoe 4 horses, if 4 shoes are put upon each horse?

2. 4 times 4 horses are how many horses?

3. How many teeth in a harrow which has 4 rows of teeth, with 5 teeth in each row?

4. How many horseshoes will be required to shoe 5 horses all round?

5. 4 times 5 hammers are how many hammers?
5 times 4 wedges are how many wedges?

6. On the wall of the shop are 4 rows of horseshoes, and 6 shoes in each row. How many horseshoes are on the wall?

7. How many wagon tires in 6 sets, there being 4 tires in one set?

8. 4 times 6 bolts are how many bolts?
6 times 4 linchpins are how many linchpins?

9. A blacksmith shod 7 horses each day for 4 days. How many horses did he shoe?

10. How many horseshoes did he use in one day?

11. 4 times 7 nail rods are how many nail rods?
7 times 4 plow points are how many plow points?

12. If a blacksmith uses 8 nails in setting one shoe, how many nails will he use in setting 4 shoes?

13. If he can make 4 iron rings in one hour, how many rings can he make in 8 hours?

14. 4 times 8 files are how many files?
8 times 4 rivets are how many rivets?

15. A blacksmith has 4 pieces of chain, and in each piece are 9 links. How many links in the 4 pieces?

16. How many tines have 9 pitchforks, each fork having 4 tines?

17. 4 times 9 shovels are how many shovels?
How many are 9 times 4 iron bands?

18. A blacksmith made 4 iron hoops for a cask, and used 10 feet of iron for each hoop. How many feet of hoop iron did he use?

19. How many wagon tires will be required for all the wheels of 10 wagons?

20. How many are 4 times 10 hooks?
How many are 10 times 4 staples?

B. 1. A drover wishes to have 16 cattle taken across a river, but only 4 cattle can be taken on the ferry-boat at one trip. How many loads will the 16 cattle make?

2. 16 cattle are

How many times 4 cattle? | 4 times how many cattle?

3. How many boat loads would 20 cattle make?

4. If 5 horses can be ferried across the river at one load, how many loads will 20 horses make?

5. 20 oxen are

How many times 4 oxen? | 4 times how many oxen?
How many times 5 oxen? | 5 times how many oxen?

6. A lady put 24 quarts of berries into cans which held 4 quarts each. How many cans did she fill?

7. Some children who had gathered 24 quarts of berries, found on dividing them that each child would have 6 quarts. How many children were there?

8. How many 4-quart pans will 24 quarts of milk fill? How many 6-quart pans?

9. If a basket maker can make 7 market baskets in one day, how many days will it take him to make 28 market baskets?

10. How many days will it take him to make 28 corn baskets, if he makes 4 in one day?

11. 28 baskets are

How many times 4 baskets? | 7 times how many baskets?

12. Isaac planted 32 beans in hills, putting 4 beans in each hill. How many hills did he plant?

13. He planted 32 hills of corn in rows of 8 hills each. How many rows were there?

14. 32 ears of corn are

How many times 4 ears? | 4 times how many ears?

15. 32 quarts of beans are

How many times 8 quarts? | 8 times how many quarts?

16. A tin peddler gave 36 cents for paper rags, at 4 cents a pound. How many pounds did he buy?

17. He paid for them in tin basins, at 9 cents apiece. How many basins did it take?

18. 36 dippers are

How many times 4 dippers? | 4 times how many dippers?

How many times 9 dippers? | 9 times how many dippers?

19. A farmer sold 40 bushels of apples to customers, selling 4 bushels to each. To how many customers did he sell the apples?

20. He sold 40 bushels of potatoes in lots of 10 bushels each. To how many persons did he sell the potatoes?

21. 40 bushels of oats are

How many times 4 bushels? | 4 times how many bushels?

22. 40 bushels of wheat are

How many times 10 bushels? | 10 times how many bushels?

C. 1. A cabinet maker made 5 bureaus, with 5 drawers in each. How many bureau drawers did he use?

2. He made 5 dining tables, each table having 6 legs. How many table legs did he use?

3. He sold a set of mahogany chairs at 5 dollars apiece. How much did he receive for them?

4. 5 times 5 wash-stands are how many wash-stands?

5. 5 times 6 footstools are how many footstools?

6. 6 times 5 picture-frames are how many picture-frames?

7. A furniture dealer sold in one day 5 lounges, at 7 dollars apiece. How much did he receive for them?

8. The same day he sold 7 bedsteads, at 5 dollars apiece. How much did they come to?

9. 5 times 7 what-nots are how many what-nots?

10. 7 times 5 desks are how many desks?

11. If a pile of wood that contains one cord is 8 feet long, how many feet long is a pile that contains 5 cords?

12. How much will 8 cords of wood cost, at 5 dollars a cord?

13. 8 times 5 pairs of tongs are how many pairs of tongs?

14. 5 times 8 fire shovels are how many fire shovels?

15. If a steamboat burns 9 tons of coal in making one trip, how many tons will she burn in making 5 trips?

16. A coal train left 9 cars at a station, and each car contained 5 tons of coal. How many tons of coal were left?

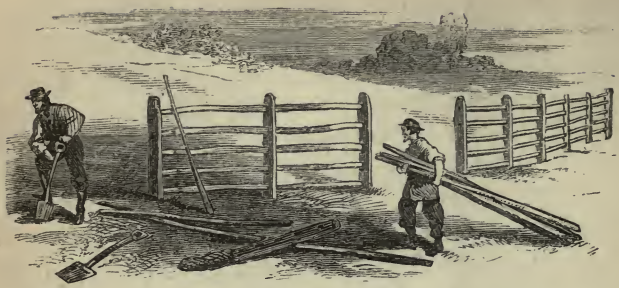
17. How many are 5 times 9 axes? 9 times 5 saws?

18. How much will 10 tons of coal cost, at 5 dollars a ton?

19. How much will 5 bushels of charcoal cost, at 10 cents a bushel?

20. How many are 5 times 10 coal scuttles?

21. How many are 10 times 5 pokers?



D. 1. How many lengths of fence, 5 rails high, can be built with 25 rails?

2. How many lengths can be built with 30 rails?

3. How many lengths can be built with 35 rails?

4. How many lengths of fence, 6 rails high, can be built with 30 rails?

5. If a man builds 7 rods of stone wall in a day, how many days will it take him to build 35 rods?

6. 25 fence stakes are how many times 5 stakes?

7. 30 pickets are

How many times 5 pickets?	5 times how many pickets?
How many times 6 pickets?	6 times how many pickets?

8. 35 fence posts are

How many times 5 posts?	7 times how many posts?
5 times how many posts?	How many times 7 posts?

9. In one month a livery-man fed his horses 40 bushels of oats, giving each horse 8 bushels. How many horses had he?

10. He paid 40 dollars for straw, at 5 dollars a load. How many loads did he buy?

11. 40 whips are	12. 40 halters are
How many times 5 whips?	5 times how many halters?
How many times 8 whips?	8 times how many halters?

13. In one term Clara attended school 45 days. How many weeks did she attend, there being 5 school-days in a week?

14. How many rows of 9 desks each in a school-room containing 45 desks?

15. 45 slates are
How many times 5 slates?
5 times how many slates?

16. 45 maps are
How many times 9 maps?
9 times how many maps?

17. A farmer took 50 bushels of wheat to mill, and for every 5 bushels, he received one barrel of flour. How many barrels of flour did he receive?

18. A miller sent 50 barrels of flour to market, in wagon loads of 10 barrels each. How many loads were there?

19. 50 sacks of buckwheat flour are
How many times 5 sacks?
How many times 10 sacks?
5 times how many sacks?
10 times how many sacks?

(See Manual, page 114.)

E. 1. How much will 4 lead-pencils cost, at 5 cents apiece?

2. If you can buy 4 plums for one cent, how many can you buy for 6 cents?

3. A hatter sold 5 silk hats, at 5 dollars each. How much did he receive for them?

4. At 5 cents apiece, how much will 6 pears cost?

5. At 4 cents a cake, how many cakes of maple sugar can I buy for 16 cents?

6. Eunice paid 25 cents for thread, at 5 cents a spool. How many spools did she buy?

7. A farmer received 20 dollars for fat sheep, at 5 dollars a head. How many sheep did he sell?

8. A woman paid 36 cents for iron spoons, at 6 cents apiece. How many spoons did she buy?

9. How many days are there in 4 weeks?

10. If a seamstress uses 4 skeins of thread in making one linen coat, how many skeins will she use in making 8 coats?

11. How many dimes, or ten-cent pieces, will pay for a pocket-knife that costs 50 cents?

12. A printer worked 10 hours a day for 5 days. How many hours did he work?

13. If 5 yards of muslin will make the curtains for one window, how many yards will be required for 7 windows?

14. A builder paid 28 dollars for window-blinds, at 4 dollars a pair. How many pairs did he buy?

15. Twenty-four tea-spoons are how many sets?

16. If 8 candles weigh one pound, how many pounds will 32 candles weigh?

17. In making flour barrels, a cooper puts 10 hoops upon every barrel. How many hoops does he put upon 4 barrels? (See Manual, page 114.)

18. A tin peddler bought 5 pounds of old brass, at 9 cents a pound. How much did it come to?

19. If I pay 45 cents for beef, at 9 cents a pound, how many pounds do I buy?

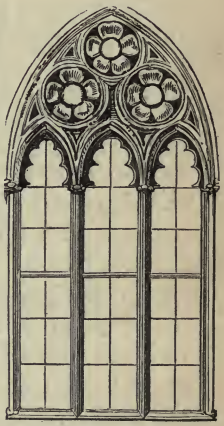
20. If one sheet of paper makes 4 leaves of a writing-book, how many leaves will 9 sheets make?

21. If a packet-boat on a canal runs 5 miles an hour, how many hours will it be in running 35 miles?

22. A grocer paid 36 dollars for vinegar, at 4 dollars a barrel. How many barrels did he buy?

SECTION VIII.

Multiplication and Division, with 6 or 7 as one factor or term. (See Manual, page 114.)



A. 1. In the main part of this Gothic window are 6 sash or sections, and in each section are 6 panes of glass. How many panes of glass in the 6 sections?

2. There are 6 panes also in each of the 3 circular sections. In 7 sections of the window, how many panes of glass?

3. How many panes of glass in 8 sections?

4. How many panes of glass in the whole window?

5. 6 times 6 boxes of glass are how many boxes?

6. How many pounds of putty are 7 times 6 pounds?

7. 8 times 6 sash weights are how many sash weights?

8. 9 times 6 sashes are how many sashes?

9. Six tea knives are called a set. How many knives in 10 sets?

10. How many silver forks are 6 times 10 forks?

11. A farmer carried 6 bushels of clover seed to a seed store, and sold it at 7 dollars a bushel. How much did he receive for it?

12. 6 times 7 bushels of grass seed are how many bushels?

13. A stove dealer sold 6 parlor stoves at 8 dollars apiece. How much did he receive for them?

14. How many stove legs are 6 times 8 stove legs?

15. How many dollars will a joiner earn in 6 weeks, if he earns 9 dollars in one week?

16. 6 times 9 planes are how many planes?

17. How much must I pay a glazier for setting 6 panes of glass, at 10 cents a pane?

18. 6 times 10 paint brushes are how many paint brushes?

19. How much will 7 cocoa-nuts cost, at 7 cents apiece?

20. How many pine-apples are 7 times 7 pine-apples?

21. If a sheet-iron worker can make 7 lengths of stove pipe in an hour, how many lengths can he make in 8 hours?

22. In a tin-ware factory are 7 workmen, and each of them can make 8 milk pails in a day. How many can all of them make?

23. 7 times 8 baking tins are how many baking tins?

24. 8 times 7 toasting-forks are how many toasting-forks?

25. A boy 9 years old asked his grandfather his age, who replied, "I am 7 times as old as you." How old was the grandfather?

26. How many days in 9 weeks?

27. How many months are 7 times 9 months?

28. How many hours are 9 times 7 hours?

29. In 7 dimes, how many cents?

30. How much will 10 bunches of grapes cost, at 7 cents a bunch?

31. 7 times 10 tomatoes are how many tomatoes?

32. 10 times 7 cucumbers are how many cucumbers?

B. 1. A crockery dealer sold 36 coffee cups, in sets of 6 cups each. How many sets did he sell?

2. Forty-two tea plates are how many sets?

3. A woman paid 42 cents for sauce plates, at 7 cents apiece. How many did she buy?

4. 36 pint bowls are

How many times 6 bowls?	6 times how many bowls?

5. 42 goblets are

How many times 6 goblets?	6 times how many goblets?
How many times 7 goblets?	7 times how many goblets?

6. At 6 cents apiece, how many salt-cellars can you buy for 48 cents?

7. A lady paid 48 cents for tumblers, at 8 cents apiece. How many did she buy?

8. 48 wine-glasses are

How many times 6 glasses?	How many times 8 glasses?
6 times how many glasses?	8 times how many glasses?

9. How many egg-cups can be bought for 54 cents, at 6 cents apiece?

10. How many match safes, at 9 cents each, can be bought for 54 cents?

11. 54 pitchers are

How many times 6 pitchers?	6 times how many pitchers?
How many times 9 pitchers?	9 times how many pitchers?

12. At 6 cents a dozen, how many dozen clothes-pins can be bought for 60 cents?

13. If a turner can turn 10 rolling-pins in an hour, how many hours must he work to turn 60 rolling-pins?

14. 60 wooden bowls are

6 times how many bowls?	How many times 6 bowls?
10 times how many bowls?	How many times 10 bowls?

15. A willow-ware dealer paid 49 dollars for willow wagons, at 7 dollars apiece. How many wagons did he buy?

16. 49 peck measures are

How many times 7 measures? | 7 times how many measures?

17. If a man can paint 7 wash-tubs in an hour, how many hours will it take him to paint 56 wash-tubs?

18. A blacksmith paid 56 cents for hammer handles, at 8 cents apiece. How many did he buy?

19. 56 wash-boards are 7 times how many wash-boards?
8 times how many washboards?
How many times 7 washboards?
How many times 8 washboards?

20. How many yards of broadcloth will be required for 63 cloth caps, if 7 caps can be made from one yard?

21. A hatter paid 63 dollars for muffs, at 9 dollars apiece. How many muffs did he buy?

22. 63 straw hats are

9 times how many hats? | How many times 7 hats?
7 times how many hats? | How many times 9 hats?

23. If 7 wool hats can be made from one pound of wool, how many pounds will be required for 70 hats?

24. A livery-man paid 70 dollars for buffalo robes, at 10 dollars apiece. How many robes did he buy?

25. 70 hat-boxes are

How many times 7 boxes? | 7 times how many boxes?
How many times 10 boxes? | 10 times how many boxes?

C. 1. A family bought 6 loaves of bread of a baker, at 6 cents a loaf. How much did it cost them?

2. They also bought 7 pounds of crackers, at 9 cents a pound. How much did the crackers cost?

3. A woman paid 60 cents for a pair of flat-irons, at 6 cents a pound. How much did they weigh?

How much must be paid

4. For 8 pocket combs, at 6 cents apiece?

5. For 10 reams of printing paper, at 7 dollars a ream?

6. For 8 pounds of potash, at 7 cents a pound?

7. For 10 fat sheep, at 6 dollars apiece?

8. If one pair of sheets can be made from 9 yards of Merrimac sheeting, how many pairs can be made from 63 yards?

9. If a woman packs 8 pounds of butter in one week, how many weeks will it take her to fill a tub which holds 48 pounds?

10. How many yards in a carpet which contains 6 breadths, each 7 yards long?

11. A church is lighted by 6 chandeliers, of 9 burners each. How many burners in all?

12. 56 yards of cloth are how many times 8 yards?

13. How many weeks in 49 days?

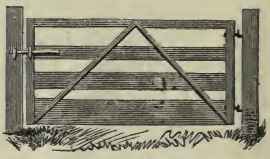
14. At 6 cents a cake, how many cakes of toilet soap can be bought for 42 cents?

15. How many paper window-curtains, at 10 cents apiece, can be bought for 70 cents?

16. A farmer sowed 54 pounds of grass seed upon his meadow, using 9 pounds to the acre. How many acres in the meadow?

SECTION IX.

Multiplication and Division, with 8, 9, or 10, as one factor or term. (See Manual, page 114.)



A. 1. If 8 pieces are used in making one farm gate, how many boards must be used for 8 farm gates?

2. How many pieces will be required for 9 farm gates?

3. How many pieces for 10 gates?

4. A carpenter uses 9 pickets in making one small gate. How many pickets will he use in making 8 gates?

5. How many pickets will he use in making 9 gates?

6. How many pickets in making 10 gates?

7. How many fence posts can a man set in 8 days, if he sets 10 posts each day?

8. How many posts can he set in 9 days?

9. How many posts in 10 days?

10. How many dolls are 8 times 8 dolls?

11. How many kites are 9 times 10 kites?

12. 9 times 8 balls are how many balls?

13. 8 times 10 tops are how many tops?

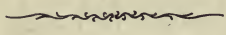
14. 9 times 9 hoops are how many hoops?

15. How many picture books are 10 times 8 picture books?

16. How many skipping-ropes are 10 times 9 skipping-ropes?

17. 8 times 9 tin trumpets are how many tin trumpets?

18. 10 times 10 marbles are how many marbles



B. 1. If 8 candles will last a family one week, how many weeks will 64 candles last them?

2. How many pounds of tallow must a woman use to make 72 candles, if she makes 8 candles from one pound?

3. At 9 cents apiece, how many tin candlesticks can be bought for 72 cents?

4. 64 lamp wicks are

How many times 8 wicks?	8 times how many wicks?

5. 72 lamps are

How many times 8 lamps?	8 times how many lamps?
How many times 9 lamps?	9 times how many lamps?

6. How many balls of candle wicking can be bought for 80 cents, at 8 cents a ball?

7. How many quarts of kerosene will a shopkeeper burn in 80 days, if one quart lasts him 10 days?

8. 80 lanterns are

How many times 8 lanterns?	10 times how many lanterns?
8 times how many lanterns?	How many times 10 lanterns?

9. A grocer paid 81 dollars for kerosene, at 9 dollars a barrel. How many barrels did he buy?

10. 81 street lamps are

9 times how many street lamps? | How many times 9 street lamps?

11. Imogene used 90 skeins of worsted in making lamp mats, using 9 skeins for each mat. How many lamp mats did she make?

12. A merchant received 90 cents for lamp shades, at 10 cents apiece. How many shades did he sell?

13. 90 gas-lights are

How many times 10 lights? | 9 times how many lights?
10 times how many lights? | How many times 9 lights?

14. At 10 cents each, how many lamp chimneys can I buy for one dollar, or 100 cents?

15. 100 oil cans are

10 times how many oil cans? | How many times 10 oil cans?

(See Manual, page 114.)

C. 1. A trunk maker sold 8 trunks, at 8 dollars apiece. How much did he receive for them?

2. A publisher paid 72 dollars for book paper, at 8 dollars a ream. How many reams did he buy?

3. How many sheets of paper will be required to make a book of 80 leaves, if one sheet is folded into 8 leaves?

4. How much will 8 baking plates cost, at 10 cents each?

5. How many plow-points, each weighing 8 pounds, can be made from 64 pounds of iron?

6. How much will a turner receive for turning 8 bed posts, at 9 cents each?

7. How much will 10 pounds of fresh fish cost, at 8 cents a pound?

8. A man bought a turkey at 10 cents a pound, and paid 80 cents for it. How many pounds did it weigh?

9. If a family use 9 pounds of lard in a month, how many months will 72 pounds last them?

10. How many pork barrels will a cooper make in 9 days, if he makes 8 barrels each day?

11. A pail maker uses 10 staves in making one wooden pail. How many staves will he use in making 9 pails?

12. How many pieces of lightning-rod, each 9 feet long, will be required to reach from the top of a church steeple, 81 feet high, to the ground?

13. In building a chimney, a mason laid 9 courses of bricks in an hour. How many hours did it take him to lay 90 courses?

14. A teamster drew 9 loads of stone each day for 9 days. How many loads did he draw?

15. How many hours will it take a steamboat, running at the rate of 10 miles an hour, to make a trip of 90 miles?

16. A barber's price for shaving one man, is 10 cents. How much will he receive for shaving 10 men?

17. How much will a music teacher receive from 10 scholars, in one quarter, if each one pays her 9 dollars?

18. How many dimes in one dollar, or 100 cents?

SECTION X.

Fractional parts of Numbers.—Halves.

A. *When any number of things is divided into two equal parts, each part is* ONE HALF *of the number of things.*

If I divide 2 pine-apples equally between two persons, each person will receive *one half* of the two pine-apples, which is one pine-apple. If I divide 4 pine-apples equally between two persons, each person will receive *one half* of 4 pine-apples, which is 2 pine-apples. *One half* of 6 pine-apples is 3 pine-apples, and *one half* of 8 pine-apples is 4 pine-apples. (See Manual, page 115.)

1. Thomas bought 2 oranges, and gave *one half* of them to his sister. How many did he give her?

2. Mr. Abbott divided 4 peaches equally between his 2 children. *What part* of the 4 peaches did he give to each child? *How many* peaches did he give to each child?

3. Jane brought 6 plums from the garden, and divided them equally between her sister and herself. *What part* of the 6 plums had each of the girls? *How many* plums had each?

4. On a pear-tree were 8 pears, but one half of them dropped off. How many dropped off? How many remained on the tree?

5. Joseph had 10 apples, and Edgar had one half as many. How many apples had Edgar?

6. One half of 2 doves is how many doves?

7. How many ducks are one half of 4 ducks?

8. How many robins are one half of 6 robins?

9. How many pigeons are one half of 8 pigeons?

10. How many canary-birds are one half of 10 canary-birds?

REMARK.—One half is expressed by figures thus, $\frac{1}{2}$.

11. A farmer having 12 cows, sold $\frac{1}{2}$ of them. How many cows did he sell?

12. A butcher bought 14 calves, and killed $\frac{1}{2}$ of them. How many calves did he kill?

13. A drover sold 16 horses one day, and $\frac{1}{2}$ as many the next day. How many horses did he sell the second day?

14. A farmer's wife raised 18 turkeys, and at Thanksgiving sold $\frac{1}{2}$ of them. How many turkeys did she sell?

15. One afternoon 2 men sheared 20 sheep, each man shearing $\frac{1}{2}$ of the number. How many sheep did one man shear?

16. How many hoes are $\frac{1}{2}$ of 12 hoes?

17. How many spades are $\frac{1}{2}$ of 14 spades?

18. How many rakes are $\frac{1}{2}$ of 16 rakes?

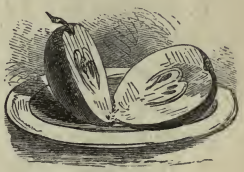
19. How many shovels are $\frac{1}{2}$ of 18 shovels?

20. How many pitchforks are $\frac{1}{2}$ of 20 pitchforks?

(See Manual, page 115.)

B. *When any thing is divided into 2 equal parts, each of the parts is $\frac{1}{2}$ of the thing.*

Two halves of any thing make the whole of the thing.



If I cut an apple into two equal parts, each part will be $\frac{1}{2}$ of the apple.

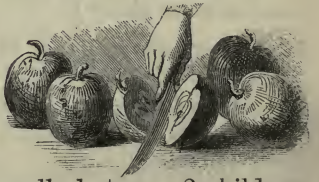
1. A father divided a large pear equally between his two children. What part of the pear did he give to each child?

2. A mother divided a yard of silk into 2 equal parts, for aprons for her two girls. How much silk did she use for each apron?

3. Byron worked one day in hoeing the potatoes in his garden, and $\frac{1}{2}$ as long in hoeing his corn. What part of a day did it take him to hoe his corn?

If I wish to divide 3 apples equally between 2 children, I can first divide 2 of the apples, by giving each child 1 apple; and I can then divide the other apple, by giving each child $\frac{1}{2}$ of it; and then each child will have one apple and $\frac{1}{2}$ of an apple, which are one and one half apples.

REMARK.—One and one half is expressed by figures thus, $1\frac{1}{2}$.



If I divide 5 apples equally between 2 children, each child will receive $2\frac{1}{2}$ apples.

(See Manual, page 115.)

4. If I divide 3 pears equally between 2 children, how many pears will each child receive?

5. One morning a hotel keeper bought 5 melons, and $\frac{1}{2}$ of them were eaten at dinner. How many melons were eaten? How many were left?

6. How many lemons are $\frac{1}{2}$ of 3 lemons? $\frac{1}{2}$ of 5 lemons?

7. How many sheets of paper are $\frac{1}{2}$ of 3 sheets? $\frac{1}{2}$ of 5 sheets?

8. If a barrel of flour costs 7 dollars, how many dollars will $\frac{1}{2}$ of a barrel cost?

9. If 2 barrels of sweet potatoes cost 7 dollars, how many dollars will one barrel cost?

10. If a man can cradle 9 acres of wheat in 2 days, how many acres can he cradle in one day?

11. If 11 acres of grass can be cut by a mowing-machine in one day, how many acres can be cut in $\frac{1}{2}$ day?

12. Two boys gathered 13 quarts of chestnuts, which they shared equally. How many quarts of chestnuts in each boy's share?

13. If Andrew can husk 15 bushels of corn in one day, how many bushels can he husk in $\frac{1}{2}$ day?

14. If 17 rolls of wall paper are used in papering 2 rooms of equal size, how many rolls are used for one room?

15. If a train of cars runs 19 miles in one hour, how many miles will it run in $\frac{1}{2}$ hour?

How much is $\frac{1}{2}$

16. Of 3 pounds of cheese?
17. Of 9 ounces of indigo?
18. Of 7 pounds of soap?
19. Of 13 gallons of vinegar?
20. Of 5 bushels of beans?
21. Of 17 pounds of codfish?
22. Of 15 ounces of cloves?
23. Of 11 barrels of sugar?
24. Of 19 pounds of rice?

C. *Any number of things is $\frac{1}{2}$ of two times that number of things.* (See Manual, page 115.)

1. Esther gave to a blind man 1 cent, which was $\frac{1}{2}$ of all her money. How many cents did she have?

2. If Harry should pay 2 cents for a top, it would take $\frac{1}{2}$ of his money. How many cents has he?

3. Reuben's boots cost $\frac{1}{2}$ as much as his coat, and his boots cost 3 dollars. How much did his coat cost?

4. On Saturday a laborer expended 4 dollars, which was $\frac{1}{2}$ of his week's wages. How many dollars did he earn that week?

5. A grocer sold 5 barrels of salt, which was $\frac{1}{2}$ of as many barrels as he had left. How many barrels had he left?

6. One inkstand is $\frac{1}{2}$ of how many inkstands?
7. Two paper-folders are $\frac{1}{2}$ of how many paper-folders?
8. Three pen-knives are $\frac{1}{2}$ of how many pen-knives?
9. Four slates are $\frac{1}{2}$ of how many slates?
10. Five photographs are $\frac{1}{2}$ of how many photographs?

11. How many hours will it take a man to hoe one acre of corn, if he hoes $\frac{1}{2}$ acre in 6 hours?

12. If a reaping machine will cut 7 acres of wheat in $\frac{1}{2}$ day, how many acres will it cut in one day?

13. If $\frac{1}{2}$ bushel of charcoal costs 8 cents, how many cents will one bushel cost?

14. Last year a farmer sold 9 tons of hay, which was $\frac{1}{2}$ of his hay crop. How many tons of hay did he raise?

15. In a half-ream of paper are 10 quires. How many quires in a ream?

16. Six bonnets are one-half of how many bonnets?

17. Seven vails are one-half of how many vails?

18. Eight collars are one-half of how many collars?

19. Nine shawls are one-half of how many shawls?

20. Ten scarfs are one-half of how many scarfs? aaj

(See Manual, page 115.)

D. 1. One and 1-half peaches are $\frac{1}{2}$ of how many peaches? (See Manual, page 115.)

2. One and 1-half barrels of beef are $\frac{1}{2}$ of how many barrels of beef?

3. Susan put $2\frac{1}{2}$ pailfuls of water into a tub, and the tub was then half filled. How many pailfuls would the tub hold?

4. If it takes $3\frac{1}{2}$ yards of broadcloth for one overcoat, how many yards will it take for 2 overcoats?

5. A certain blackboard is $\frac{1}{2}$ as wide as it is long, and it is $4\frac{1}{2}$ feet wide. How many feet long is it?

6. In one rod there are $5\frac{1}{2}$ yards. How many yards in 2 rods?

7. If $6\frac{1}{2}$ pounds of sugar can be bought for a half-dollar, how many pounds can be bought for a dollar?

8. A miller exchanged 2 barrels of flour, worth $7\frac{1}{2}$ dollars a barrel, for a barrel of mackerel. How much was the mackerel worth?

9. In a week a farmer's wife sold $8\frac{1}{2}$ pounds of butter, which was $\frac{1}{2}$ of all she made. How many pounds did she make?

10. How many dollars will 2 rocking-chairs cost, at $9\frac{1}{2}$ dollars apiece?

11. $1\frac{1}{2}$ pounds of butter are $\frac{1}{2}$ of how many pounds?

12. $3\frac{1}{2}$ yards of calico are $\frac{1}{2}$ of how many yards?

13. $7\frac{1}{2}$ pounds of starch are $\frac{1}{2}$ of how many pounds?

14. $4\frac{1}{2}$ ounces of nutmegs are $\frac{1}{2}$ of how many ounces?

15. $2\frac{1}{2}$ tons of plaster are $\frac{1}{2}$ of how many tons?

16 $8\frac{1}{2}$ gallons of oil are $\frac{1}{2}$ of how many gallons?

17. $5\frac{1}{2}$ bushels of charcoal are $\frac{1}{2}$ of how many bushels?

18. $9\frac{1}{2}$ barrels of pork are $\frac{1}{2}$ of how many barrels?

19. $6\frac{1}{2}$ bushels of turnips are $\frac{1}{2}$ of how many bushels?

E. *In any one thing there are 2 halves; and in any number of things there are two times as many halves as whole ones.*

1. If I divide 2 water-melons into halves, how many halves will there be? (See Manual, page 116.)

2. Alice gave an orange to her sisters, giving $\frac{1}{2}$ an orange to each. How many sisters had she?

3. Among how many scholars will I divide 3 pencils, if I give $\frac{1}{2}$ pencil to each scholar?

4. If I use $\frac{1}{2}$ sheet of paper to cover one book, how many books can I cover with 4 sheets of paper?

5. How many half-days of school are there in 5 school-days?

6. How many halves in 1 peach?

7. How many halves in 2 turnips?

8. How many halves in 3 heads of cabbage?

9. How many halves in 4 pumpkins?

10. How many halves in 5 loaves of bread?

11. A cap maker received 6 dollars for making caps, at $\frac{1}{2}$ dollar apiece. How many caps did she make?

12. How many times can a half-bushel measure be filled from 7 bushels of potatoes?

13. How many bushels of apples can I buy for 8 dollars, at $\frac{1}{2}$ dollar a bushel?

14. How many days will it take you to write 9 pages, if you write $\frac{1}{2}$ page each day?

15. If a shoemaker can make a pair of shoes in $\frac{1}{2}$ day, how many pairs can he make in 10 days?

16. How many half-hours are there in 6 hours?

17. In 7 pailfuls of water, how many half-pailfuls?

18. If you cut 8 pies into halves, how many halves will there be?

19. How many half-dollars are 9 dollars?

20. In 10 bushels of apples, how many half-bushels?

F. 1. Two halves of an apple are equal to how many apples. (See Manual, page 116.)

2. Four half-apples are equal to how many apples?

3. How many whole loaves of cake are 6 half-loaves equal to?

4. How many pints of ink can be put into 8 half-pint bottles?

5. A grocer sold 10 half-pound packages of tea. How many pounds did he sell?

6. How many acres of land in 12 half-acre lots?

7. If you are absent from school $\frac{1}{2}$ day each week, how many days of schooling do you lose in a term of 14 weeks?

8. How many feet long is a board which can be cut into 18 pieces, each $\frac{1}{2}$ foot in length?

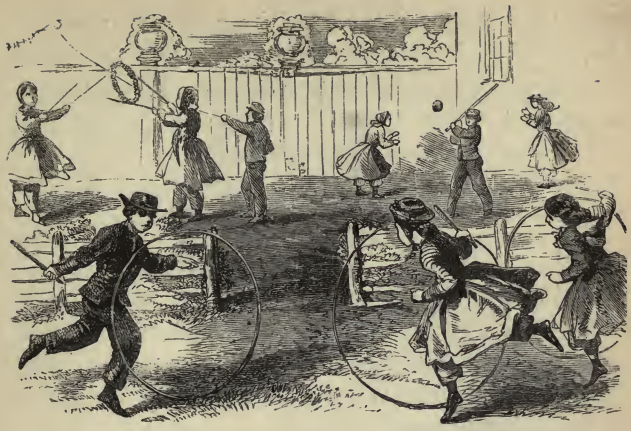
9. If a sewing girl earns $\frac{1}{2}$ dollar a day, how many dollars can she earn in 20 days?

10. A merchant tailor made 16 cravats, using $\frac{1}{2}$ yard of silk for each cravat. How many yards of silk did he use for all?

11. How many hours in 2 half-hours?
12. How many minutes in 6 half-minutes?
13. How many dollars in 10 half-dollars?
14. How many miles in 8 half-miles?
15. How many inches in 4 half-inches?
16. In 12 half-tons of coal, how many tons?
17. In 18 half-cords of wood, how many cords?
18. In 14 half-gallons of syrup, how many gallons?
19. In 20 half-barrels of fish, how many barrels?
20. In 16 half-pecks of tomatoes, how many pecks?

G. 1. $\frac{1}{2}$ of 2 is how many?
2. How many are $\frac{1}{2}$ of 5?
3. How many are $\frac{1}{2}$ of 4?
4. How many are $\frac{1}{2}$ of 7?
5. How many are $\frac{1}{2}$ of 9?
6. How many are $\frac{1}{2}$ of 6?
7. How many are $\frac{1}{2}$ of 8?
8. How many are $\frac{1}{2}$ of 13?
9. How many are $\frac{1}{2}$ of 19?
10. How many are $\frac{1}{2}$ of 12?
11. How many are $\frac{1}{2}$ of 1?
12. How many are $\frac{1}{2}$ of 10?
13. How many are $\frac{1}{2}$ of 3?
14. How many are $\frac{1}{2}$ of 15?
15. How many are $\frac{1}{2}$ of 18?
16. How many are $\frac{1}{2}$ of 11?
17. How many are $\frac{1}{2}$ of 14?
18. How many are $\frac{1}{2}$ of 20?
19. How many are $\frac{1}{2}$ of 17?
20. How many are $\frac{1}{2}$ of 16?

21. 1 is $\frac{1}{2}$ of how many?
22. 2 are $\frac{1}{2}$ of how many?
23. 5 are $\frac{1}{2}$ of how many?
24. 4 are $\frac{1}{2}$ of how many?
25. $1\frac{1}{2}$ are $\frac{1}{2}$ of how many?
26. $2\frac{1}{2}$ are $\frac{1}{2}$ of how many?
27. 6 are $\frac{1}{2}$ of how many?
28. $3\frac{1}{2}$ are $\frac{1}{2}$ of how many?
29. 9 are $\frac{1}{2}$ of how many?
30. $4\frac{1}{2}$ are $\frac{1}{2}$ of how many?
31. 3 are $\frac{1}{2}$ of how many?
32. $5\frac{1}{2}$ are $\frac{1}{2}$ of how many?
33. 7 are $\frac{1}{2}$ of how many?
34. $8\frac{1}{2}$ are $\frac{1}{2}$ of how many?
35. 10 are $\frac{1}{2}$ of how many?
36. $6\frac{1}{2}$ are $\frac{1}{2}$ of how many?
37. 8 are $\frac{1}{2}$ of how many?
38. $9\frac{1}{2}$ are $\frac{1}{2}$ of how many?
39. $7\frac{1}{2}$ are $\frac{1}{2}$ of how many?
40. $\frac{1}{2}$ is $\frac{1}{2}$ of how many?



SECTION XI.

Fractional parts of Numbers.—Thirds.

A. *When any number of things is divided into three equal parts, each part is* ONE THIRD *of the number of things; and two of the parts are* TWO THIRDS *of the number of things.*

1. In this picture we see 3 boys at play, and one third of their number is in the street. How many boys are in the street?

2. In the picture are also 6 girls at play, and one third of their number is in the street. How many girls are in the street? (See Manual, page 116.)

3. One third of the 9 children are playing ball. How many children are playing ball?

4. Two thirds of the 3 children rolling hoop are girls. How many girls are rolling hoop?

5. Two thirds of the 6 children in the yard are girls. How many girls are in the yard?

6. Two thirds of the 9 children at play are girls. How many girls are at play?

Remark.—One third is expressed by figures thus, $\frac{1}{3}$; and two thirds is expressed thus, $\frac{2}{3}$.

7. How many hoops are $\frac{1}{3}$ of 3 hoops?
8. How many hoops are $\frac{2}{3}$ of 3 hoops?
9. How many trees are $\frac{1}{3}$ of 6 trees?
10. How many trees are $\frac{2}{3}$ of 6 trees?
11. How many posts are $\frac{1}{3}$ of 9 posts?
12. How many posts are $\frac{2}{3}$ of 9 posts?

13. Some children presented to their teacher 12 flowers, $\frac{1}{3}$ of which were dahlias, and $\frac{2}{3}$ roses. How many of the flowers were dahlias? How many of them were roses?

14. How many chickens are $\frac{1}{3}$ of 15 chickens?

15. How many rabbits are $\frac{2}{3}$ of 15 rabbits?

16. One third of twenty-one pictures are how many pictures?

17. Two thirds of 21 leaves are how many leaves?

18. A dress-maker earned 18 dollars in 3 weeks. *What part of* 18 *dollars* did she earn in one week? *How many dollars* did she earn in one week?

19. What part of the 18 dollars did she earn in two weeks? How many dollars did she earn in two weeks?

20. Jay has 27 marbles, and Hiram has $\frac{1}{3}$ as many. How many marbles has Hiram?

21. Charles has $\frac{2}{3}$ as many marbles as Jay. How many marbles has Charles?

22. How many beans are $\frac{1}{3}$ of 24 beans?

23. How many beans are $\frac{2}{3}$ of 24 beans?

24. One third of 30 kernels of corn are how many kernels?

25. Two thirds of 30 kernels of corn are how many kernels?

B. *Any number of things is $\frac{1}{3}$ of 3 times that number of things.*

1. Homer bought some sea-shells, and gave his sister 1 of them, which was $\frac{1}{3}$ of all he bought. How many did he buy?

2. Arthur picked 2 melons, which were $\frac{1}{3}$ of all that grew on the vine. How many grew on the vine?

3. One fish hook is $\frac{1}{3}$ of how many fish-hooks?

4. Two nets are 1 third of how many nets?

5. Three fish lines are $\frac{1}{3}$ of how many fish lines?

6. Four oars are 2 thirds of how many oars?

7. Five vials are $\frac{1}{3}$ of how many vials?

8. If $\frac{1}{3}$ of a barrel of pork costs 6 dollars, how much does a barrel cost? (See Manual, page 116.)

9. Nine bushels of wheat grew on $\frac{1}{3}$ of an acre of land. How many bushels would 1 acre produce, at the same rate?

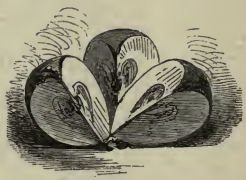
10. Seven days are $\frac{1}{3}$ of how many days?

11. The water in a certain well is 10 feet deep, and the depth of the water is $\frac{1}{3}$ of the depth of the well. How deep is the well?

12. If a family use 8 pounds of sugar in $\frac{1}{3}$ of a month, how many pounds will they use in a month?

C. *When any thing is divided into three equal parts, one of the parts is* $\frac{1}{3}$ *of the thing; and two of the parts are* $\frac{2}{3}$ *of the thing.*

In any thing there are 3 *thirds; and in any number of things there are* 3 *times as many thirds as whole ones.*



If I cut an apple into 3 equal parts, each part will be $\frac{1}{3}$ of the apple, and 2 of the parts will be $\frac{2}{3}$ of the apple. $\frac{3}{3}$ of an apple make the whole apple.

1. Among how many girls can I divide an apple, if I give each of them $\frac{1}{3}$ of the apple?

2. Into how many thirds can 2 pies be cut?

(See Manual, page 117.)

3. How many pounds of coffee can I buy for 3 dollars, at $\frac{1}{3}$ of a dollar a pound?

4. If a horse eats $\frac{1}{3}$ of a bushel of oats in one day, how many days will 5 bushels last him?

5. A milliner cut 4 yards of bonnet wire into pieces, and each piece was $\frac{1}{3}$ of a yard long. How many pieces did the 4 yards make?

6. How many thirds in 6 pine-apples?

7. How many thirds of an hour in 8 hours?

8. A paper-hanger cut 7 rolls of wall paper into strips, each containing $\frac{1}{3}$ of a roll. How many strips were there?

9. A lady used 9 pounds of sugar in canning strawberries, using $\frac{1}{3}$ of a pound for each can. How many cans did she put up?

10. In 10 barrels of water lime, how many thirds of a barrel?

D. 1. How many cords of wood in 3 thirds of a cord?

2. If 1 pair of shoes can be made from $\frac{1}{3}$ of a calf-skin, how many calf-skins will be used for 6 pairs of shoes?

3. A milliner had 9 remnants of ribbon, each piece $\frac{1}{3}$ of a yard long. How many yards in all the remnants?

4. A brick is $\frac{1}{3}$ of a foot wide. How many feet in width is a walk that consists of 12 rows of bricks?

5. A dog crosses a road at 18 leaps, of $\frac{1}{3}$ of a rod each. How many rods wide is the road?

6. A silversmith made 30 spoons, using $\frac{1}{3}$ of an ounce of silver for each. How many ounces of silver did he use?

7. If an engine burns $\frac{1}{3}$ of a ton of coal in one day, how many tons will it burn in 24 days?

8. If $\frac{1}{3}$ of a barrel of flour will last a family a month, how many barrels will last them 15 months?

9. One foot is equal to $\frac{1}{3}$ of a yard. 27 feet are equal to how many yards?

10. How much must a laboring man pay for pasturing his cow 27 weeks, at $\frac{1}{3}$ of a dollar a week?

E.

1. $\frac{1}{3}$ of 3 is how many?
2. How many are $\frac{1}{3}$ of 6?
3. How many are $\frac{1}{3}$ of 15?
4. How many are $\frac{1}{3}$ of 24?
5. How many are $\frac{1}{3}$ of 9?
6. How many are $\frac{1}{3}$ of 21?
7. How many are $\frac{1}{3}$ of 18?
8. How many are $\frac{1}{3}$ of 30?
9. How many are $\frac{1}{3}$ of 27?
10. How many are $\frac{1}{3}$ of 12?
11. 1 is $\frac{1}{3}$ of how many?
12. 2 are $\frac{1}{3}$ of how many?
13. 5 are $\frac{1}{3}$ of how many?
14. 4 are $\frac{1}{3}$ of how many?
15. 6 are $\frac{1}{3}$ of how many?
16. 3 are $\frac{1}{3}$ of how many?
17. 10 are $\frac{1}{3}$ of how many?
18. 8 are $\frac{1}{3}$ of how many?
19. 7 are $\frac{1}{3}$ of how many?
20. 9 are $\frac{1}{3}$ of how many?

SECTION XII.

Fractional Parts of Numbers.—Fourths.

A. *When any number of things is divided into* 4 *equal parts, one of the parts is* ONE FOURTH, *two of the parts are* TWO FOURTHS, *and three of the parts,* THREE FOURTHS *of the number of things.*

REMARK.—One fourth is expressed by figures thus, $\frac{1}{4}$; two fourths are expressed thus, $\frac{2}{4}$; and three fourths thus, $\frac{3}{4}$.

1. How many marks are $\frac{1}{4}$ of 4 marks?
2. How many marks are $\frac{1}{4}$ of 8 marks?
3. How many marks are $\frac{1}{4}$ of 12 marks?
4. How many marks are $\frac{1}{4}$ of 16 marks?
5. How many marks are $\frac{2}{4}$ of 12 marks?
6. How many marks are $\frac{2}{4}$ of 4 marks?
7. How many marks are $\frac{2}{4}$ of 16 marks?
8. How many marks are $\frac{2}{4}$ of 8 marks?
9. How many marks are $\frac{3}{4}$ of 8 marks?
10. How many marks are $\frac{3}{4}$ of 4 marks?
11. How many marks are $\frac{3}{4}$ of 12 marks?
12. How many marks are $\frac{3}{4}$ of 16 marks?
13. In one peck of walnuts there are 8 quarts. How many quarts in $\frac{1}{4}$ of a peck? (See Manual, page 117.)

14. In $\frac{2}{4}$ of a peck of cherries, how many quarts?

15. How many quarts in $\frac{3}{4}$ of a peck of grass seed?

16. In one foot there are 12 inches. How many inches in $\frac{1}{4}$ of a foot?

17. How many inches in $\frac{2}{4}$ of a foot?

18. How many inches in $\frac{3}{4}$ of a foot?

19. In one pound there are 16 ounces. How many ounces in $\frac{1}{4}$ of a pound?

20. How many ounces in $\frac{2}{4}$ of a pound?

21. How many ounces in $\frac{3}{4}$ of a pound?

22. If 4 loaves of bread cost 20 cents, what part of 20 cents will 1 loaf cost? How many cents will 1 loaf cost?

23. What part of 20 cents will 2 loaves cost? How many cents will 2 loaves cost?

24. How many cents will 3 loaves cost?

25. There are 24 hours in one day. How many hours in $\frac{1}{4}$ of a day?

26. How many hours in $\frac{2}{4}$ of a day?

27. In $\frac{3}{4}$ of a day, how many hours?

28. There are 36 inches in one yard. How many inches in $\frac{1}{4}$ of a yard?

29. How many inches in $\frac{3}{4}$ of a yard of ribbon?

30. A teamster feeds to his horses one ton of hay in 28 days. How many days will $\frac{1}{4}$ of a ton last them?

31. How many days will $\frac{3}{4}$ of a ton last them?

32. A man set out 40 fruit-trees, but $\frac{1}{4}$ of them died. How many of the trees died?

33. Of the trees set out, $\frac{2}{4}$ were apple-trees, and the others were cherry-trees. How many fourths were cherry-trees? How many trees were cherry-trees? How many were apple-trees?

34. Since $\frac{1}{4}$ of the trees died, how many fourths of them lived? How many trees lived?

B. 1. If $\frac{1}{4}$ of a yard of silk velvet costs 1 dollar, how much will 1 yard cost?

2. One dollar is $\frac{1}{4}$ of how many dollars?

3. How much will 1 pound of putty cost, if $\frac{1}{4}$ of a pound costs 2 cents? (See Manual, page 117.)

4. Two cents are $\frac{1}{4}$ of how many cents?

5. Three eggs are $\frac{1}{4}$ of a dozen. How many eggs make a dozen?

6. How many ounces in 1 pound of tea, there being 4 ounces in $\frac{1}{4}$ of a pound?

7. In $\frac{1}{4}$ of a ton of hay there are 5 hundred pounds. How many hundred pounds in a ton of hay?

8. There are 6 sheets of paper in $\frac{1}{4}$ of a quire. How many sheets of paper in a quire?

9. If a man can do $\frac{1}{4}$ of a certain job of work in 7 days, in how many days can he do all of it?

10. If a boy can earn 8 cents in $\frac{1}{4}$ of a day, how many cents can he earn in a day?

11. If a printer can print 9 business cards in $\frac{1}{4}$ of a minute, how many cards can he print in one minute?

12. How much will 1 pound of cinnamon cost, at the rate of 10 cents for $\frac{1}{4}$ of a pound?

C. *When any thing is divided into four equal parts, one of the parts is* $\frac{1}{4}$, *two of the parts are* $\frac{2}{4}$, *and three of the parts are* $\frac{3}{4}$ *of the thing.*

In any thing there are four fourths; and in any number of things there are four times as many fourths as whole ones.

1. Among how many children can I divide 1 apple, if I give them $\frac{1}{4}$ of an apple apiece?

2. Into how many village lots can 2 acres of land be divided, and each lot contain $\frac{1}{4}$ acre?

3. If one glass of lemonade can be made from $\frac{1}{4}$ of a lemon, how many glasses can be made from 3 lemons? (See Manual, page 117.)

4. In a tinsmith's shop is a pile of boxes of sheet tin. Each box is $\frac{1}{4}$ of a foot thick, and the pile is 4 feet high. How many boxes are there?

5. How many boxes of strawberries can be bought for 5 dollars, at $\frac{1}{4}$ of a dollar a box?

6. If 1 sack of flour is equal to $\frac{1}{4}$ of a barrel, how many sacks are equal to 6 barrels?

7. How many fourths of a day in 7 days?

8. How many quarter-barrel kegs can be filled from 8 barrels of white-fish?

9. In 9 cords of wood, how many fourths of a cord?

10. A grocer bought 10 pounds of ground pepper in quarter-pound boxes. How many boxes did he buy?

D. 1. A bookseller sold 4 books, at $\frac{1}{4}$ of a dollar each. How many dollars did he receive for them?

2. How many dollars are 8 fourths of a dollar?

3. How many bushels in 36 fourths of a bushel?

4. A milliner made 16 head-dresses, using $\frac{1}{4}$ of a yard of lace for each. How many yards of lace did she use for all? (See Manual, page 117.)

5. How many hours will it take Andrew to hoe 20 rows of corn, if he hoes one row in $\frac{1}{4}$ of an hour?

6. A boy sold 24 old newspapers, at $\frac{1}{4}$ of a cent apiece. How much did he get for them?

7. In one day a carman drew 28 loads of freight, at 1 quarter of a dollar a load. How many dollars did he receive for his day's work?

8. If one quart of milk will make $\frac{1}{4}$ of a pound of cheese, how many pounds of cheese can be made from 32 quarts of milk?

9. My writing-book contains 12 leaves, and each leaf is $\frac{1}{4}$ of a sheet of foolscap paper. How many sheets of foolscap in the book?

10. How many dollars will 40 pounds of raisins cost, at $\frac{1}{4}$ of a dollar a pound?

E.

1. $\frac{1}{4}$ of 4 is how many?
2. How many are $\frac{1}{4}$ of 8?
3. How many are $\frac{1}{4}$ of 32?
4. How many are $\frac{1}{4}$ of 20?
5. How many are $\frac{1}{4}$ of 36?
6. How many are $\frac{1}{4}$ of 12?
7. How many are $\frac{1}{4}$ of 28?
8. How many are $\frac{1}{4}$ of 40?
9. How many are $\frac{1}{4}$ of 16?
10. How many are $\frac{1}{4}$ of 24?
11. 1 is $\frac{1}{4}$ of how many?
12. 5 are $\frac{1}{4}$ of how many?
13. 9 are $\frac{1}{4}$ of how many?
14. 2 are $\frac{1}{4}$ of how many?
15. 7 are $\frac{1}{4}$ of how many?
16. 10 are $\frac{1}{4}$ of how many?
17. 4 are $\frac{1}{4}$ of how many?
18. 6 are $\frac{1}{4}$ of how many?
19. 3 are $\frac{1}{4}$ of how many?
20. 8 are $\frac{1}{4}$ of how many?

SECTION XIII.

Miscellaneous Problems:

EMBRACING ALL THE CLASSES OF COMBINATIONS IN THE PRECEDING SECTIONS.—(*See Manual, Page* 118.)

1. A lady paid 9 dollars for a breastpin, and 4 dollars for a ring. How many dollars did she pay out?

2. Louise, having 13 cents, paid 5 cents for a spool of thread. How many cents had she left?

3. How many bottles of ink, at 6 cents a bottle, can be bought for 42 cents?

4. If your father gives you 5 cents each day, how many cents will he give you in 7 days?

5. How many cords of wood in a pile 56 feet long, if 8 feet in length make one cord?

6. If a cow gives 7 quarts of milk in the morning, and 8 quarts at night, how many quarts does she give in a day?

7. A boy worked 8 months, at 6 dollars a month. How many dollars did he earn?

8. How many days in 9 school weeks, of 5 days each?

9. If 3 pounds of starch cost 30 cents, how much will 1 pound cost?

10. How much will $\frac{1}{4}$ of a barrel of mackerel cost, at 16 dollars a barrel?

11. If a mason can earn 19 dollars in 2 weeks, how much can he earn in 1 week?

12. How much will $\frac{1}{2}$ dozen eggs cost, at 18 cents a dozen?

13. When vinegar is 20 cents a gallon, how much must I pay for $\frac{1}{2}$ gallon?

14. I paid 12 cents for 4 oranges. How much did they cost me apiece?

15. A man paid 6 dollars for $\frac{1}{4}$ of a chest of tea. What was the price of the whole chest?

16. If $\frac{1}{2}$ ton of hay costs 6 dollars, how much will 1 ton cost?

17. If a boy earns 21 dollars in 3 months, how much does he earn in a month?

18. A newsboy has 16 papers, 9 of which are dailies, and the others are illustrated weeklies. How many are weeklies?

19. A grocer having 15 gallons of molasses in a barrel, drew out 7 gallons. How many gallons remained in the barrel?

20. A man set out 11 peach-trees in his garden, but 6 of them died. How many lived?

21. At 10 cents a pound, how many pounds of grapes can I buy for 80 cents?

22. A servant girl deposited 9 dollars in a savings-bank at one time, 5 dollars at another, and 7 dollars at another. How much money did she deposit?

23. Oliver, having 19 cents, paid 10 cents for a ball, and 4 cents for an orange. How many cents had he left?

24. A nursery-man sold to a customer 9 young apple-trees, 6 pear-trees, and 4 cherry-trees. How many trees did the customer buy?

25. A lady bought of a market gardener 8 cucumbers, at 3 cents apiece, and a quart of string beans for 6 cents. How much did she pay the gardener?

26. A printer worked 6 weeks for 9 dollars a week, and 1 week for 10 dollars. How much did he earn in the seven weeks?

27. A milkman brought to market 5 gallons of milk in one can, and 8 gallons in another. After selling 10 gallons, how many gallons had he left?

28. How many 10-dollar bills will be required to pay for 5 yards of broadcloth, at 4 dollars a yard?

29. If grandmother can knit 3 pairs of stockings in a week, how many pairs can she knit in 6 weeks?

30. How much will $\frac{1}{2}$ bushel of lime cost, at 16 cents a bushel?

31. How much will $\frac{1}{4}$ of a yard of canvas cost, at 40 cents a yard?

32. I bought $\frac{1}{2}$ yard of cambric, at 14 cents a yard. How much did it cost me?

33. At 8 cents a dozen, how much will $\frac{1}{2}$ dozen cucumbers cost?

34. If you pay 9 cents for 3 yards of tape, what is the price of 1 yard?

35. How much will $\frac{1}{2}$ dozen tea knives cost, at 7 dollars a dozen?

36. When clover seed is 8 dollars a bushel, how much must a farmer pay for 1 peck, or $\frac{1}{4}$ bushel?

37. My parlor is 7 yards long, and 6 yards wide. How many breadths of carpeting, 1 yard wide, will it take to cover the floor? How many yards must I buy for a carpet?

38. One day a livery horse was driven at the rate of 6 miles an hour, for 9 hours. How many miles did he travel?

39. A farmer paid out 36 dollars for sheep, at 4 dollars a head. How many sheep did he buy?

40. At 9 dollars a ton, how many tons of coal can be bought for 54 dollars?

41. A boy worked 8 weeks, for 3 dollars a week, and spent 10 dollars of his wages for a coat. How much money had he left?

42. A charcoal man sold 7 bushels of coal to one person, 3 bushels to another, and 5 to another. How many bushels did he sell to the three persons?

43. A boy, having 18 cents, paid 5 cents for a ball, and 6 cents for a club. How many cents had he left?

44. How many pairs of boots, at 3 dollars a pair, will pay for 3 tons of coal, at 8 dollars a ton?

45. At 7 cents a pound, how much must a woman pay for 2 flat-irons which weigh 5 pounds each?

46. If a bricklayer works 4 days in a week, at 2 dollars a day, how much will he earn in 9 weeks?

47. How much will $\frac{1}{2}$ ton of old iron come to, at 9 dollars a ton?

48. A shoemaker hired a shop for 36 dollars a year, agreeing to pay the rent at the end of every quarter, that is, at the end of every $\frac{1}{4}$ of the year. How much was the rent for 1 quarter? How much for 3 quarters?

49. The railroad fare from Boston to Buffalo is 11 dollars, and children between 5 and 12 years old are carried for half-fare. How much will 1 half-fare ticket cost?

50. A tailor received 15 dollars for making 2 fine coats. How much did he receive for making each?

51. If four pounds of cotton bats cost 32 cents, how much will 1 pound cost? How much will 7 pounds cost?

52. A woman sold 3 quarts of berries for 27 cents. How much was that for 1 quart?

53. If a surveyor can earn 15 dollars in 3 days, how much can he earn in 1 day?

54. A map agent sold 9 maps of the United States, at 8 dollars apiece. How many dollars did he receive for them?

55. A grocer bought 6 dozen eggs of one man, and 8 dozen of another. How many dozen eggs did he buy?

56. After selling 10 dozen of the eggs, how many dozen would he have left?

57. Samuel set out 63 cabbage plants, putting 9 plants in a row. How many rows were there?

58. A man bought 5 cords of hard wood, at 5 dollars a cord, and 1 cord of soft wood for 4 dollars. How much did all the wood cost him?

59. If a farmer can dig 5 bushels of potatoes in an hour, and his boy 4 bushels, how many bushels can they both dig in 6 hours?

60. Frances bought 7 yards of calico, at 10 cents a yard, and a spool of thread for 5 cents. How much did her purchases amount to?

61. A father earns 8 dollars a week, and his son earns 2 dollars. How much do both of them earn in 9 weeks?

62. How many 6-acre lots of land are equal to 3 10-acre lots?

63. If a barber can earn 5 dollars in one day, how much can he earn in $\frac{1}{2}$ day?

64. Two farmers paid 17 dollars for a horse-rake, each paying $\frac{1}{2}$ of the price. How many dollars did each man pay?

65. A farmer pays a hired man 18 dollars a month, and a boy $\frac{1}{3}$ as much. How much a month does he pay the boy?

66. How much will $\frac{1}{4}$ of a pound of cloves cost, at 28 cents a pound?

67. How many melons, at 6 cents apiece, must be given for 9 oranges, at 4 cents apiece?

68. If 5 oranges cost 15 cents, how much will 9 oranges cost?

69. If 4 slates cost 32 cents, how much will 10 slates cost?

70. A shoemaker made 8 pairs of boots, and sold them at 5 dollars a pair, and the stock which he used in them cost him 9 dollars. How much did he receive for his labor?

71. A stage-coach started with 9 passengers, and on the trip 6 more passengers got aboard the stage, and 8 left it. How many passengers were aboard, at the end of the trip?

72. If a man can build 24 rods of stone-wall in 6 days, how many rods can he build in 9 days?

73. If 6 panes of window-glass cost 30 cents, how much will 8 panes cost?

74. How much must be paid for 6 quarts of milk, if 5 quarts cost 25 cents?

75. A boy paid 18 cents for 2 fish-lines. How much would 5 fish-lines cost, at the same rate?

76. If 9 lead pencils cost 27 cents, how much will 10 lead pencils cost?

77. How much must I pay for 4 weeks' board, if I pay at the rate of 21 dollars for 7 weeks?

78. If 5 pounds of iron castings cost 20 cents, how much will 7 pounds cost?

79. David and Levi paid 8 cents for 16 apples. Levi paid 3 cents of the money. How many of the apples ought he to have?

80. Horace paid 15 cents for a spelling-book, and $\frac{2}{3}$ as much for a writing-book. How much did his writing-book cost him?

81. Lemuel bought $\frac{2}{3}$ of a dozen buttons for his coat, at 24 cents a dozen. How much did they cost him? How many buttons did he buy?

82. Eight men gave five dollars apiece to buy a cow for a soldier's widow. After paying for the cow, the widow had four dollars of the money left. How much did the cow cost?

83. If one tinsmith can make 4 milk-pans in an hour, and another can make 3, how many milk-pans can they both make in 10 hours?

84. A carpenter earned 10 dollars one week, and 9 dollars the next, and, after paying his expenses for the two weeks, he had 5 dollars left. How much were his expenses?

85. A farmer raised 30 bushels of beans, and sold $\frac{2}{5}$ of them. How many bushels did he sell?

86. A blacksmith pays 6 dollars a month for the rent of his house, and 3 dollars a month for the rent of his shop. How much rent does he pay in 6 months?

87. A shoemaker bought 36 pounds of leather, and $\frac{3}{4}$ of it was sole-leather. How much sole-leather did he buy?

88. How much will $\frac{3}{4}$ of a bushel of turnips cost, at 20 cents a bushel?

89. A bushel of oats weighs 32 pounds. How much does $\frac{3}{4}$ of a bushel weigh?

90. If 4 pounds of maple sugar can be made from 8 gallons of sap, how many gallons of sap will be required for $\frac{1}{2}$ pound of sugar?

91. If 24 hogs can be fattened on the corn that grows on 6 acres of land, how many hogs can be fattened on the corn that grows on $\frac{1}{2}$ acre?

92. If a farmer's boy can harrow 18 acres of land in 2 days, how many acres can he harrow in $\frac{1}{3}$ of a day?

93. It takes a stage-coach $\frac{2}{3}$ of an hour to run the distance between two villages, running at the rate of 54 miles in 9 hours. How many miles apart are the two villages?

94. If it takes 40 bushels of potatoes to plant 5 acres of land, how many bushels will it take to plant $\frac{1}{4}$ of an acre?

95. How many bushels will it take to plant $\frac{3}{4}$ of an acre?

96. If a blacksmith, by working 10 hours a day, can make 60 horseshoes, how many shoes can he make in $1\frac{1}{2}$ hours?

97. 4 times 2 are $\frac{1}{3}$ of what number?

98. 3 times 3 are $\frac{1}{4}$ of what number?

99. 4 times 5 are $\frac{2}{3}$ of what number?

100. 4 times 4 are $\frac{2}{4}$ of what number?

101. 2 times 9 are $\frac{3}{4}$ of how many?

102. 9 is $\frac{1}{3}$ of how many?

103. 10 is $\frac{1}{4}$ of how many?

104. 18 is $\frac{2}{3}$ of what number?

105. 30 is $\frac{3}{4}$ of what number?

106. $\frac{1}{3}$ of 30 are how many times 5?

107. $\frac{1}{4}$ of 36 are how many times 3?

108. $\frac{2}{4}$ of 40 are how many times 10?

109. $\frac{2}{3}$ of 30 are how many times 4?

110. $\frac{3}{4}$ of 32 are how many times 6?

111. 7 is $\frac{1}{8}$ of how many times 2?

SECTION XIV.

Tables of the Denominations of Money, Weight, and Measures, in Common Use.

(See Manual, page 118.)

A. UNITED STATES MONEY.

10 mills are 1 cent,	1 dollar is 100 cents,
100 cents are 1 dollar.	1 cent is 10 mills.

A Coin is a piece of metal, stamped by authority of government, to give it a fixed value.

The American Coins are of Copper, Nickel, Silver, and Gold.

Copper and Nickel Coins.—Cent, 2-cent piece, 3-cent piece.

Silver Coins.—3-cent piece, 5-cent piece or half-dime, 10-cent piece or dime, 25-cent piece or quarter-dollar, 50-cent piece or half-dollar.

Gold Coins.—Dollar, $2\frac{1}{2}$-dollar piece or quarter-eagle, 3-dollar piece, 5-dollar piece or half-eagle, 10-dollar piece or eagle, 20-dollar piece or double-eagle, 50-dollar piece.

REMARK.—United States Money is also called *Federal Money.*

B. WEIGHT.

16 ounces are 1 pound,	1 ton is 20 hundred-weight,
100 pounds are 1 hundred-weight,	1 hundred-weight is 100 pounds,
20 hundred-weight are 1 ton.	1 pound is 16 ounces.

REMARK.—This weight is called *Avoirdupois Weight.*

C. LINE MEASURE.

12 inches are 1 foot,
3 feet are 1 yard,
5½ yards, or 16½ feet } are 1 rod,
320 rods are 1 mile.

1 mile is 320 rods,
1 rod is 16½ feet, or 5½ yards,
1 yard is 3 feet,
1 foot is 12 inches.

REMARK.—This measure is also called *Linear Measure*, and *Long Measure*.

D. LIQUID MEASURE.

4 gills are 1 pint,
2 pints are 1 quart,
4 quarts are 1 gallon.

1 gallon is 4 quarts,
1 quart is 2 pints,
1 pint is 4 gills.

E. DRY MEASURE.

2 pints are 1 quart,
8 quarts are 1 peck,
4 pecks are 1 bushel.

1 bushel is 4 pecks,
1 peck is 8 quarts,
1 quart is 2 pints.

F. PAPER.

24 sheets are 1 quire,
20 quires are 1 ream.

1 ream is 20 quires,
1 quire is 24 sheets.

G. COUNTING.

12 things are 1 dozen,
12 dozen are 1 gross.

1 gross is 12 dozen,
1 dozen is 12 things.

20 things are 1 score,
5 score are 1 hundred.

1 hundred is 5 score,
1 score is 20 things.

H. TIME.

60 seconds are 1 minute,
60 minutes are 1 hour,
24 hours are 1 day,
7 days are 1 week,
52 weeks 1 day, or 365 days } are 1 common year,
52 weeks 2 days, or 366 days } are 1 leap-year,
100 years are 1 century.

1 century is 100 years,
1 leap-year is { 366 days, or 52 weeks 2 days
1 common year is { 365 days, or 52 weeks 1 day,
1 week is 7 days,
1 day is 24 hours,
1 hour is 60 minutes,
1 minute is 60 seconds.

DAYS OF THE WEEK.

First Day, ... Sunday;
Second Day, . . . Monday;
Third Day, ... Tuesday;
Fourth Day, . . . Wednesday;
Fifth Day, ... Thursday,
Sixth Day, ... Friday;
Seventh Day, . . . Saturday.

MONTHS OF THE YEAR.

First Month, ...	January, ...	31 days.
Second Month, ...	February, ...	28 days.
Third Month, ...	March, ...	31 days.
Fourth Month, ...	April, ...	30 days.
Fifth Month, ...	May, ...	31 days.
Sixth Month, ...	June, ...	30 days.
Seventh Month, ...	July, ...	31 days.
Eighth Month, ...	August, ...	31 days.
Ninth Month, ...	September, ...	30 days.
Tenth Month, ...	October, ...	31 days.
Eleventh Month, ...	November, ...	30 days.
Twelfth Month, ...	December, ...	31 days.

February has 28 days in a common year, and 29 in a leap year.

THE SEASONS.

SPRING.	SUMMER.	FALL, or AUTUMN.	WINTER.
March,	June,	September,	December,
April,	July,	October,	January,
May.	August.	November.	February.

SECTION XV.

Tables of Combinations in Addition and Subtraction, Multiplication and Division.

(For methods of teaching these Tables, see Manual, pages 118.)

A. ADDITION AND SUBTRACTION.

1.

0 and 1 is 1, 1 and 0 is 1;	0 from 1 leaves 1, 1 from 1 leaves 0
1 and 1 are 2;	1 from 2 leaves 1
2 and 1 are 3, 1 and 2 are 3;	2 from 3 leaves 1, 1 from 3 leaves 2
3 and 1 are 4, 1 and 3 are 4;	3 from 4 " 1, 1 from 4 " 3
4 and 1 are 5, 1 and 4 are 5;	4 from 5 " 1, 1 from 5 " 4
5 and 1 are 6, 1 and 5 are 6;	5 from 6 " 1, 1 from 6 " 5
6 and 1 are 7, 1 and 6 are 7;	6 from 7 " 1, 1 from 7 " 6
7 and 1 are 8, 1 and 7 are 8;	7 from 8 " 1, 1 from 8 " 7
8 and 1 are 9, 1 and 8 are 9;	8 from 9 " 1, 1 from 9 " 8
9 and 1 are 10, 1 and 9 are 10;	9 from 10 " 1, 1 from 10 " 9
10 and 1 are 11, 1 and 10 are 11;	10 from 11 " 1, 1 from 11 "10

2.

0 and 2 are 2, 2 and 0 are 2;	0 from 2 leaves 2, 2 from 2 leaves 0
1 and 2 are 3, 2 and 1 are 3;	1 from 3 leaves 2, 2 from 3 leaves 1
2 and 2 are 4;	2 from 4 leaves 2
3 and 2 are 5, 2 and 3 are 5;	3 from 5 " 2, 2 from 5 " 3
4 and 2 are 6, 2 and 4 are 6;	4 from 6 " 2, 2 from 6 " 4
5 and 2 are 7, 2 and 5 are 7;	5 from 7 " 2, 2 from 7 " 5
6 and 2 are 8, 2 and 6 are 8;	6 from 8 " 2, 2 from 8 " 6
7 and 2 are 9, 2 and 7 are 9;	7 from 9 " 2, 2 from 9 " 7
8 and 2 are 10, 2 and 8 are 10;	8 from 10 " 2, 2 from 10 " 8
9 and 2 are 11, 2 and 9 are 11;	9 from 11 " 2, 2 from 11 " 9
10 and 2 are 12, 2 and 10 are 12;	10 from 12 " 2, 2 from 12 "10

3.

0 and 3 are 3,	3 and 0 are 3;	0 from 3 leaves 3,	3 from 3 leaves 0
1 and 3 are 4,	3 and 1 are 4;	1 from 4 leaves 3,	3 from 4 leaves 1
2 and 3 are 5,	3 and 2 are 5;	2 from 5 leaves 3,	3 from 5 leaves 2
3 and 3 are 6;		3 from 6 leaves 3,	
4 and 3 are 7,	3 and 4 are 7;	4 from 7 " 3,	3 from 7 " 4
5 and 3 are 8,	3 and 5 are 8;	5 from 8 " 3,	3 from 8 " 5
6 and 3 are 9,	3 and 6 are 9;	6 from 9 " 3,	3 from 9 " 6
7 and 3 are 10,	3 and 7 are 10;	7 from 10 " 3,	3 from 10 " 7
8 and 3 are 11,	3 and 8 are 11;	8 from 11 " 3,	3 from 11 " 8
9 and 3 are 12,	3 and 9 are 12;	9 from 12 " 3,	3 from 12 " 9
10 and 3 are 13,	3 and 10 are 13;	10 from 13 " 3,	3 from 13 "10

4.

0 and 4 are 4,	4 and 0 are 4;	0 from 4 leaves 4,	4 from 4 leaves 0
1 and 4 are 5,	4 and 1 are 5;	1 from 5 leaves 4,	4 from 5 leaves 1
2 and 4 are 6,	4 and 2 are 6;	2 from 6 leaves 4,	4 from 6 leaves 2
3 and 4 are 7,	4 and 3 are 7;	3 from 7 " 4,	4 from 7 " 3
4 and 4 are 8;		4 from 8 leaves 4,	
5 and 4 are 9,	4 and 5 are 9;	5 from 9 " 4,	4 from 9 " 5
6 and 4 are 10,	4 and 6 are 10;	6 from 10 " 4,	4 from 10 " 6
7 and 4 are 11,	4 and 7 are 11;	7 from 11 " 4,	4 from 11 " 7
8 and 4 are 12,	4 and 8 are 12;	8 from 12 " 4,	4 from 12 " 8
9 and 4 are 13,	4 and 9 are 13;	9 from 13 " 4,	4 from 13 " 9
10 and 4 are 14,	4 and 10 are 14;	10 from 14 " 4,	4 from 14 "10

5.

0 and 5 are 5,	5 and 0 are 5;	0 from 5 leaves 5,	5 from 5 leaves 0
1 and 5 are 6,	5 and 1 are 6;	1 from 6 leaves 5,	5 from 6 leaves 1
2 and 5 are 7,	5 and 2 are 7;	2 from 7 leaves 5,	5 from 7 leaves 2
3 and 5 are 8,	5 and 3 are 8;	3 from 8 " 5,	5 from 8 " 3
4 and 5 are 9,	5 and 4 are 9;	4 from 9 " 5,	5 from 9 " 4
5 and 5 are 10;		5 from 10 leaves 5,	
6 and 5 are 11,	5 and 6 are 11;	6 from 11 " 5,	5 from 11 " 6
7 and 5 are 12,	5 and 7 are 12;	7 from 12 " 5,	5 from 12 " 7
8 and 5 are 13,	5 and 8 are 13;	8 from 13 " 5,	5 from 13 " 8
9 and 5 are 14,	5 and 9 are 14;	9 from 14 " 5,	5 from 14 " 9
10 and 5 are 15,	5 and 10 are 15;	10 from 15 " 5,	5 from 15 "10

6.

0 and 6 are 6,	6 and 0 are 6;
1 and 6 are 7,	6 and 1 are 7;
2 and 6 are 8,	6 and 2 are 8;
3 and 6 are 9,	6 and 3 are 9;
4 and 6 are 10,	6 and 4 are 10;
5 and 6 are 11,	6 and 5 are 11;
6 and 6 are 12;	
7 and 6 are 13,	6 and 7 are 13;
8 and 6 are 14,	6 and 8 are 14;
9 and 6 are 15,	6 and 9 are 15;
10 and 6 are 16,	6 and 10 are 16;

0 from 6 leaves 6,	6 from 6 leaves 0
1 from 7 " 6,	6 from 7 " 1
2 from 8 " 6,	6 from 8 " 2
3 from 9 " 6,	6 from 9 " 3
4 from 10 " 6,	6 from 10 " 4
5 from 11 " 6,	6 from 11 " 5
6 from 12 leaves 6,	
7 from 13 " 6,	6 from 13 " 7
8 from 14 " 6,	6 from 14 " 8
9 from 15 " 6,	6 from 15 " 9
10 from 16 " 6,	6 from 16 "10

7.

0 and 7 are 7,	7 and 0 are 7;
1 and 7 are 8,	7 and 1 are 8;
2 and 7 are 9,	7 and 2 are 9;
3 and 7 are 10,	7 and 3 are 10;
4 and 7 are 11,	7 and 4 are 11;
5 and 7 are 12,	7 and 5 are 12;
6 and 7 are 13,	7 and 6 are 13;
7 and 7 are 14;	
8 and 7 are 15,	7 and 8 are 15;
9 and 7 are 16,	7 and 9 are 16;
10 and 7 are 17,	7 and 10 are 17;

0 from 7 leaves 7,	7 from 7 leaves 0
1 from 8 " 7,	7 from 8 " 1
2 from 9 " 7,	7 from 9 " 2
3 from 10 " 7,	7 from 10 " 3
4 from 11 " 7,	7 from 11 " 4
5 from 12 " 7,	7 from 12 " 5
6 from 13 " 7,	7 from 13 " 6
7 from 14 leaves 7,	
8 from 15 " 7,	7 from 15 " 8
9 from 16 " 7,	7 from 16 " 9
10 from 17 " 7,	7 from 17 "10

8.

0 and 8 are 8,	8 and 0 are 8;
1 and 8 are 9,	8 and 1 are 9;
2 and 8 are 10,	8 and 2 are 10;
3 and 8 are 11,	8 and 3 are 11;
4 and 8 are 12,	8 and 4 are 12;
5 and 8 are 13,	8 and 5 are 13;
6 and 8 are 14,	8 and 6 are 14;
7 and 8 are 15,	8 and 7 are 15;
8 and 8 are 16;	
9 and 8 are 17,	8 and 9 are 17;
10 and 8 are 18,	8 and 10 are 18;

0 from 8 leaves 8,	8 from 8 leaves 0
1 from 9 " 8,	8 from 9 " 1
2 from 10 " 8,	8 from 10 " 2
3 from 11 " 8,	8 from 11 " 3
4 from 12 " 8,	8 from 12 " 4
5 from 13 " 8,	8 from 13 " 5
6 from 14 " 8,	8 from 14 " 6
7 from 15 " 8,	8 from 15 " 7
8 from 16 leaves 8,	
9 from 17 " 8,	8 from 17 " 9
10 from 18 " 8,	8 from 18 "10

9.

0 and 9 are 9,	9 and 0 are 9;	0 from 9 leaves 9,	9 from 9 leaves 0
1 and 9 are 10,	9 and 1 are 10;	1 from 10 " 9,	9 from 10 " 1
2 and 9 are 11,	9 and 2 are 11;	2 from 11 " 9,	9 from 11 " 2
3 and 9 are 12,	9 and 3 are 12;	3 from 12 " 9,	9 from 12 " 3
4 and 9 are 13,	9 and 4 are 13;	4 from 13 " 9,	9 from 13 " 4
5 and 9 are 14,	9 and 5 are 14;	5 from 14 " 9,	9 from 14 " 5
6 and 9 are 15,	9 and 6 are 15;	6 from 15 " 9,	9 from 15 " 6
7 and 9 are 16,	9 and 7 are 16;	7 from 16 " 9,	9 from 16 " 7
8 and 9 are 17,	9 and 8 are 17;	8 from 17 " 9,	9 from 17 " 8
9 and 9 are 18;		9 from 18 leaves 9,	
10 and 9 are 19,	9 and 10 are 19;	10 from 19 " 9,	9 from 19 "10

10.

0 and 10 are 10,	10 and 0 are 10;	0 from 10 leaves 10,	10 from 10 leaves 0
1 and 10 are 11,	10 and 1 are 11;	1 from 11 " 10,	10 from 11 " 1
2 and 10 are 12,	10 and 2 are 12;	2 from 12 " 10,	10 from 12 " 2
3 and 10 are 13,	10 and 3 are 13;	3 from 13 " 10,	10 from 13 " 3
4 and 10 are 14,	10 and 4 are 14;	4 from 14 " 10,	10 from 14 " 4
5 and 10 are 15,	10 and 5 are 15;	5 from 15 " 10,	10 from 15 " 5
6 and 10 are 16,	10 and 6 are 16;	6 from 16 " 10,	10 from 16 " 6
7 and 10 are 17,	10 and 7 are 17;	7 from 17 " 10,	10 from 17 " 7
8 and 10 are 18,	10 and 8 are 18;	8 from 18 " 10,	10 from 18 " 8
9 and 10 are 19,	10 and 9 are 19;	9 from 19 " 10,	10 from 19 " 9
10 and 10 are 20;		10 from 20 leaves 10.	

B. MULTIPLICATION AND DIVISION.

1.

Once 1 is 1;		1 in 1 1 time,	
2 times 1 are 2,	Once 2 is 2;	1 in 2 2 times,	2 in 2 1 time.
3 times 1 are 3,	Once 3 is 3;	1 in 3 3 times,	3 in 3 1 "
4 times 1 are 4,	Once 4 is 4;	1 in 4 4 times,	4 in 4 1 "
5 times 1 are 5,	Once 5 is 5;	1 in 5 5 times,	5 in 5 1 "
6 times 1 are 6,	Once 6 is 6;	1 in 6 6 times,	6 in 6 1 "
7 times 1 are 7,	Once 7 is 7;	1 in 7 7 times,	7 in 7 1 "
8 times 1 are 8,	Once 8 is 8;	1 in 8 8 times,	8 in 8 1 "
9 times 1 are 9,	Once 9 is 9;	1 in 9 9 times,	9 in 9 1 "
10 times 1 are 10,	Once 10 is 10;	1 in 10 10 times,	10 in 10 1 "

2.

1 time 2 is 2,	2 times 1 are 2;	2 in 2 1 times,
2 times 2 are 4;		2 in 4 2 times,
3 times 2 are 6,	2 times 3 are 6;	2 in 6 3 "
4 times 2 are 8,	2 times 4 are 8;	2 in 8 4 "
5 times 2 are 10,	2 times 5 are 10;	2 in 10 5 "
6 times 2 are 12,	2 times 6 are 12;	2 in 12 6 "
7 times 2 are 14,	2 times 7 are 14;	2 in 14 7 "
8 times 2 are 16,	2 times 8 are 16;	2 in 16 8 "
9 times 2 are 18,	2 times 9 are 18;	2 in 18 9 "
10 times 2 are 20,	2 times 10 are 20;	2 in 20 10 "

1 in 2 2 times,		
2 times,		
3 in 6 2 "		
4 in 8 2 "		
5 in 10 2 "		
6 in 12 2 "		
7 in 14 2 "		
8 in 16 2 "		
9 in 18 2 "		
10 in 20 2 "		

3.

1 time 3 is 3,	3 times 1 are 3;	3 in 3 1 times,
2 times 3 are 6,	3 times 2 are 6;	3 in 6 2 times,
3 times 3 are 9;		3 in 9 3 times,
4 times 3 are 12,	3 times 4 are 12;	3 in 12 4 "
5 times 3 are 15,	3 times 5 are 15;	3 in 15 5 "
6 times 3 are 18,	3 times 6 are 18;	3 in 18 6 "
7 times 3 are 21,	3 times 7 are 21;	3 in 21 7 "
8 times 3 are 24,	3 times 8 are 24;	3 in 24 8 "
9 times 3 are 27,	3 times 9 are 27;	3 in 27 9 "
10 times 3 are 30,	3 times 10 are 30;	3 in 30 10 "

1 in 3 3 times,		
2 in 6 3 times,		
4 in 12 3 "		
5 in 15 3 "		
6 in 18 3 "		
7 in 21 3 "		
8 in 24 3 "		
9 in 27 3 "		
10 in 30 3 "		

4.

1 time 4 is 4,	4 times 1 are 4;	4 in 4 1 times,
2 times 4 are 8,	4 times 2 are 8;	4 in 8 2 times,
3 times 4 are 12,	4 times 3 are 12;	4 in 12 3 "
4 times 4 are 16;		4 in 16 4 times,
5 times 4 are 20,	4 times 5 are 20;	4 in 20 5 "
6 times 4 are 24,	4 times 6 are 24;	4 in 24 6 "
7 times 4 are 28,	4 times 7 are 28;	4 in 28 7 "
8 times 4 are 32,	4 times 8 are 32;	4 in 32 8 "
9 times 4 are 36,	4 times 9 are 36;	4 in 36 9 "
10 times 4 are 40,	4 times 10 are 40;	4 in 40 10 "

1 in 4 4 times,		
2 in 8 4 times,		
3 in 12 4 "		
5 in 20 4 "		
6 in 24 4 "		
7 in 28 4 "		
8 in 32 4 "		
9 in 36 4 "		
10 in 40 4 "		

5.

1 time 5 is 5,	5 times 1 are 5;	5 in 5 1 times, 1 in 5 5 times
2 times 5 are 10,	5 times 2 are 10;	5 in 10 2 " , 2 in 10 5 "
3 times 5 are 15,	5 times 3 are 15;	5 in 15 3 " , 3 in 15 5 "
4 times 5 are 20,	5 times 4 are 20;	5 in 20 4 " , 4 in 20 5 "
5 times 5 are 25;		5 in 25 5 times,
6 times 5 are 30,	5 times 6 are 30;	5 in 30 6 " , 6 in 30 5 "
7 times 5 are 35,	5 times 7 are 35;	5 in 35 7 " , 7 in 35 5 "
8 times 5 are 40,	5 times 8 are 40;	5 in 40 8 " , 8 in 40 5 "
9 times 5 are 45,	5 times 9 are 45;	5 in 45 9 " , 9 in 45 5 "
10 times 5 are 50,	5 times 10 are 50;	5 in 50 10 " , 10 in 50 5 "

6.

1 time 6 is 6,	6 times 1 are 6;	6 in 6 1 times, 1 in 6 6 times
2 times 6 are 12,	6 times 2 are 12;	6 in 12 2 " , 2 in 12 6 "
3 times 6 are 18,	6 times 3 are 18;	6 in 18 3 " , 3 in 18 6 "
4 times 6 are 24,	6 times 4 are 24;	6 in 24 4 " , 4 in 24 6 "
5 times 6 are 30,	6 times 5 are 30;	6 in 30 5 " , 5 in 30 6 "
6 times 6 are 36;		6 in 36 6 times,
7 times 6 are 42,	6 times 7 are 42;	6 in 42 7 " , 7 in 42 6 "
8 times 6 are 48,	6 times 8 are 48;	6 in 48 8 " , 8 in 48 6 "
9 times 6 are 54,	6 times 9 are 54;	6 in 54 9 " , 9 in 54 6 "
10 times 6 are 60,	6 times 10 are 60;	6 in 60 10 " , 10 in 60 6 "

7.

1 time 7 is 7,	7 times 1 are 7;	7 in 7 1 times, 1 in 7 7 times
2 times 7 are 14,	7 times 2 are 14;	7 in 14 2 " , 2 in 14 7 "
3 times 7 are 21,	7 times 3 are 21;	7 in 21 3 " , 3 in 21 7 "
4 times 7 are 28,	7 times 4 are 28;	7 in 28 4 " , 4 in 28 7 "
5 times 7 are 35,	7 times 5 are 35;	7 in 35 5 " , 5 in 35 7 "
6 times 7 are 42,	7 times 6 are 42;	7 in 42 6 " , 6 in 42 7 "
7 times 7 are 49;		7 in 49 7 times,
8 times 7 are 56,	7 times 8 are 56;	7 in 56 8 " , 8 in 56 7 "
9 times 7 are 63,	7 times 9 are 63;	7 in 63 9 " , 9 in 63 7 "
10 times 7 are 70,	7 times 10 are 70;	7 in 70 10 " , 10 in 70 7 "

8.

1 time 8 is 8,	8 times 1 are 8;	8 in 8 1 times, 1 in 8 8 times
2 times 8 are 16,	8 times 2 are 16;	8 in 16 2 times, 2 in 16 8 times
3 times 8 are 24,	8 times 3 are 24;	8 in 24 3 “, 3 in 24 8 “
4 times 8 are 32,	8 times 4 are 32;	8 in 32 4 “, 4 in 32 8 “
5 times 8 are 40,	8 times 5 are 40;	8 in 40 5 “, 5 in 40 8 “
6 times 8 are 48,	8 times 6 are 48;	8 in 48 6 “, 6 in 48 8 “
7 times 8 are 56,	8 times 7 are 56;	8 in 56 7 “, 7 in 56 8 “
8 times 8 are 64;		8 in 64 8 times,
9 times 8 are 72,	8 times 9 are 72;	8 in 72 9 “, 9 in 72 8 “
10 times 8 are 80,	8 times 10 are 80;	8 in 80 10 “, 10 in 80 8 “

9.

1 time 9 is 9,	9 times 1 are 9;	9 in 9 1 times, 1 in 9 9 times
2 times 9 are 18,	9 times 2 are 18;	9 in 18 2 times, 2 in 18 9 times
3 times 9 are 27,	9 times 3 are 27;	9 in 27 3 “, 3 in 27 9 “
4 times 9 are 36,	9 times 4 are 36;	9 in 36 4 “, 4 in 36 9 “
5 times 9 are 45,	9 times 5 are 45;	9 in 45 5 “, 5 in 45 9 “
6 times 9 are 54,	9 times 6 are 54;	9 in 54 6 “, 6 in 54 9 “
7 times 9 are 63,	9 times 7 are 63;	9 in 63 7 “, 7 in 63 9 “
8 times 9 are 72,	9 times 8 are 72;	9 in 72 8 “, 8 in 72 9 “
9 times 9 are 81;		9 in 81 9 times,
10 times 9 are 90,	9 times 10 are 90;	9 in 90 10 “, 10 in 90 9 “

10.

1 time 10 is 10,	10 times 1 are 10;	10 in 10 1 times, 1 in 10 10 times
2 times 10 are 20,	10 times 2 are 20;	10 in 20 2 times, 2 in 20 10 times
3 times 10 are 30,	10 times 3 are 30;	10 in 30 3 “, 3 in 30 10 “
4 times 10 are 40,	10 times 4 are 40;	10 in 40 4 “, 4 in 40 10 “
5 times 10 are 50,	10 times 5 are 50;	10 in 50 5 “, 5 in 50 10 “
6 times 10 are 60,	10 times 6 are 60;	10 in 60 6 “, 6 in 60 10 “
7 times 10 are 70,	10 times 7 are 70;	10 in 70 7 “, 7 in 70 10 “
8 times 10 are 80,	10 times 8 are 80;	10 in 80 8 “, 8 in 80 10 “
9 times 10 are 90,	10 times 9 are 90;	10 in 90 9 “, 9 in 90 10 “
10 times 10 are 100;		10 in 100 10 times.

C. FACTOR OR DIVISION TABLE.

4 is 2 times 2;
6 is 3 times 2, or 2 times 3;
8 is 4 times 2, or 2 times 4;
9 is 3 times 3;
10 is 5 times 2, or 2 times 5;
12 is { 6 times 2, or 2 times 6;
4 times 3, or 3 times 4;
14 is 7 times 2, or 2 times 7;
15 is 5 times 3, or 3 times 5;
16 is 8 times 2, or 2 times 8, or 4 times 4;
18 is { 9 times 2, or 2 times 9;
6 times 3, or 3 times 6;
20 is { 10 times 2, or 2 times 10;
5 times 4, or 4 times 5;
21 is 7 times 3, or 3 times 7;
24 is { 8 times 3, or 3 times 8;
6 times 4, or 4 times 6;
25 is 5 times 5;
27 is 9 times 3, or 3 times 9;
28 is 7 times 4, or 4 times 7;
30 is { 10 times 3, or 3 times 10;
6 times 5, or 5 times 6;
32 is 8 times 4, or 4 times 8;
35 is 7 times 5, or 5 times 7;
36 is 9 times 4, or 4 times 9, or 6 times 6;
40 is { 10 times 4, or 4 times 10;
8 times 5, or 5 times 8;
42 is 6 times 7, or 7 times 6;
45 is 9 times 5, or 5 times 9;
48 is 8 times 6, or 6 times 8;
49 is 7 times 7;
50 is 10 times 5, or 5 times 10;
54 is 9 times 6, or 6 times 9;
56 is 8 times 7, or 7 times 8;
60 is 10 times 6, or 6 times 10;
63 is 9 times 7, or 7 times 9;
64 is 8 times 8;
70 is 10 times 7, or 7 times 10;
72 is 9 times 8, or 8 times 9;
80 is 10 times 8, or 8 times 10;
81 is 9 times 9;
90 is 10 times 9, or 9 times 10;
100 is 10 times 10.

(*See Manual, page* 120.)

D. TABLE OF ALIQUOT OR FRACTIONAL PARTS.

1 is $\frac{1}{2}$ of 2	1 is $\frac{1}{3}$ of 3	1 is $\frac{1}{4}$ of 4
2 is $\frac{1}{2}$ of 4	2 is $\frac{1}{3}$ of 6	2 is $\frac{1}{4}$ of 8
3 is $\frac{1}{2}$ of 6	3 is $\frac{1}{3}$ of 9	3 is $\frac{1}{4}$ of 12
4 is $\frac{1}{2}$ of 8	4 is $\frac{1}{3}$ of 12	4 is $\frac{1}{4}$ of 16
5 is $\frac{1}{2}$ of 10	5 is $\frac{1}{3}$ of 15	5 is $\frac{1}{4}$ of 20
6 is $\frac{1}{2}$ of 12	6 is $\frac{1}{3}$ of 18	6 is $\frac{1}{4}$ of 24
7 is $\frac{1}{2}$ of 14	7 is $\frac{1}{3}$ of 21	7 is $\frac{1}{4}$ of 28
8 is $\frac{1}{2}$ of 16	8 is $\frac{1}{3}$ of 24	8 is $\frac{1}{4}$ of 32
9 is $\frac{1}{2}$ of 18	9 is $\frac{1}{3}$ of 27	9 is $\frac{1}{4}$ of 36
10 is $\frac{1}{2}$ of 20	10 is $\frac{1}{3}$ of 30	10 is $\frac{1}{4}$ of 40

MANUAL

OF

METHODS AND SUGGESTIONS.

Oral Instruction.—Very much of your success as a primary teacher will depend upon the kind of oral instruction you impart, and the manner in which you conduct your classes.

If you make judicious use of the methods, hints, and suggestions contained in this Manual; if you enter into the work of oral instruction with earnestness and zeal, using proper discretion and judgment, you will find that your pupils will soon partake of your spirit, and your efforts will be rewarded with the most satisfactory results.

In attempting to be energetic, you must not forget to be persevering also. Do not pass too rapidly over a subject or lesson. Endeavor to fix every point in the mind of the pupil so thoroughly that he can readily recall it at any future time. To do this, you must dwell upon the point until you are sure the pupil *understands* it. And here you are cautioned not to confound memory with understanding. The learning of Tables and Combinations is an act of memory; the solving of problems or examples intelligently, necessarily involves understanding, or reason and judgment. It is not enough that the pupil repeats your words, or the language of the book; you must extemporize questions, as *tests* of his *understanding* of the lesson or subject. The suggestions on teaching children to count (page 110) will indicate to you a course that you may pursue with any section or exercise in which the pupil encounters obstacles.

Incidental Instruction.—You will add much interest to this study, by familiar conversations with the pupils about the pictures in the lessons, and the various objects represented in them. Many of the pictures represent mechanical, manufacturing, and other business operations and industrial pursuits, about which children should be instructed. Encourage them to visit factories, shops, and other places of business of the kinds represented in the pictures, or suggested by them or by the examples, for the purpose of obtaining information. When either pictures or examples contain objects or terms with which a child is unacquainted, explain them to him, consulting a dictionary whenever you do not understand the object to be explained, or the term to be defined.

Use of Books in Class.—The mere memorizing of the language of a problem or example, is no part of the true object for which

Mental Arithmetic should be studied. The attempt to memorize and reproduce problems or concrete examples, verbatim, occupies and confines the mind, and thus prevents its free exercise in forming the combinations and discovering the reasons for them. Therefore, generally, let the pupil use his book during recitation, unless the lesson is one upon abstract combinations.

Forms of Answer.—Abundant experience has fully established the fact that young children are not generally capable of understandingly making a rigid application of the principles of logical analysis, in the solution of arithmetical problems.

In most cases, children who have had no previous instruction or training in numbers, will give the result of a problem first, and the *because* afterward. So generally is this the case, that it may be regarded as the natural order of development of mind in its first steps in concrete numbers. Hence, while several forms of answer or solution are given to one or more concrete examples in each of the different classes of combinations in this book, the first answer given, in any case, conforms to this view.

You should require only very brief answers from young children, and you should not insist upon, or exact from them, formulated analyses logically stated. But you should always require pupils to give answers that are correct in language, and to form complete sentences, introducing the numbers contained in the question. For example: Sarah has 3 roses, and Eliza has 5. How many roses have the two girls?

Answers. (1.) *The two girls have* 8 *roses; because* 3 *roses and* 5 *roses are* 8 *roses.* Or,

(2.) *The two girls have* 3 *roses and* 5 *roses, which are* 8 *roses.* Or,

(3.) 3 *roses and* 5 *roses are* 8 *roses. Therefore, the two girls have* 8 *roses.*

Any question involving but a single combination of abstract numbers, admits of only a brief answer. For example:

How many are 7 and 4? Ans. 7 *and* 4 *are* 11.

What is the difference between 12 and 5? Ans. *The difference between* 12 *and* 5 *is* 7.

How many are 3 times 8? Ans. 3 *times* 8 *are* 24.

How many times is 4 contained in 24? Ans. 4 *is contained in* 24 6 *times.*

Any attempt at a *because*, or to give a reason, in the answer to questions of this kind, is evidently worse than useless.

You are again reminded that you are not expected in all cases to adopt the forms of answer given as models in this Manual. Whenever a better form can be given for any particular class of questions, adopt it. But before doing this, be sure that it *is* better, 1st. For the particular class of problems; and 2d. For the pupil or class under instruction.

Answers in Review Articles.—In the review of each section —which is the last article, or the one preceding the last—encourage the pupils to solve the questions in various ways. Thus, after an example has been solved by one of the class, ask who can give a different solution; or, who can obtain the answer by a different process, or in a different way. Continue this method, till you have fully tested both the ingenuity of the class and their understanding of the examples.

Slate and Blackboard Exercises.—Make daily use of blackboard and slates. Upon the former place combinations, tables, etc., as models for the pupils; and require the pupils to use the latter in copying your work. For particular suggestions upon this subject, see directions for teaching the tables, pages 118–120.

We will now pass to suggestions to which references are made in various parts of the book.

SECTION I.—**Page 8.**—Exercise the class upon the objects represented in the pictures, and then with other objects or counters, until all of them can count ten. Then name familiar objects not in sight, as men, animals, birds, fruit, flowers, houses, trees, etc., and require the class to count them or tell the number. This may be done by asking familiar questions relating to the objects, and involving definite numbers not exceeding ten. Thus: How many apples must I have to give one to each girl in this class? How many peaches to give one to each boy? How many cherries to give one to each pupil? How many horses has your father? How many cows? How many birds has your sister? How many houses on this street? When the class can associate the numbers with concrete objects, and not before they can do so, exercise them in counting abstractly. You may vary the following model exercises, according to circumstances:

I. CHILDREN NAMING THE NUMBERS.—*One.* How many heads have you? How many necks? How many bodies? How many right hands? How many left hands? How many right feet?

Two. How many eyes have you? How many hands? How many feet? How many ears has a horse? How many feet has a bird? Count two. Commence at two and count down to nothing.

Three. How many children do you see in the picture on the first page of this book? How many heads have they all together? How many faces? Count three. Count from three down to nothing.

Four. How many hands have two boys? How many feet? How many arms? How many eyes? How many fingers on your right hand? How many feet has a horse? A dog? A cow? A kitten? Count four. Count from four down to nothing.

Five. Count the thumb and all the fingers on the right hand; how many are there? How many on the left hand? In the last picture on

page 24 how many bags do you see in the pile on the floor? Count five. Count from five down to nothing.

Six. (Place 3 girls before the class.) How many hands have these girls? How many arms? How many eyes? How many feet? How many books in this pile? (Six books.) How many marks have I made on the blackboard? (Six marks.) How many feet have a man and a horse? A man and a dog? A cat and a bird? An ox and a chicken? Count from 0 to 6 and back again.

Pursue the same course with 7, 8, 9, and 10.

II. TEACHER NAMING THE NUMBERS.—1. Hold up 3 fingers. Hold up 7 fingers. 1 finger. 9 fingers. 5 fingers. 2 fingers, etc.

2. On the blackboard (or your slate) make 4 marks in a row. (Thus, ////.) In another row, below this one, make 7 marks. In other rows, below these, make 2 marks; 5 marks; 8 marks, etc.

3. Clap your hands 6 times. (Let these exercises first be accompanied with oral counting, and then with mental or silent counting, by the class. Sometimes count for the class, and test their knowledge by making mistakes.) Clap your hands 4 times. 3 times. 8 times. Take 5 steps across the room. Take 9 steps. 7 steps. 10 steps. 0 step.

4. Tell me the names of 4 girls whom you know. The names of 6 boys. Of 8 men. Of 3 kinds of flowers. Of 5 kinds of animals.

5. Which is the first day of the week? Which is the second day? The third day? &c. Put 8 books in a pile and count them. Number them, commencing at the top of the pile: thus, *first book*, *second book*, and so on. Number them from the bottom of the pile. (In a similar manner, teach the ordinals of 9 and 10.)

6. Show me 9 things of the same kind—as 9 apples, 9 slates, 9 marbles, or any other objects. Name 10 kinds of fruit.

7. Count, 8, 5, 10, 3, 7, 4, 1, 6, 9, 2. Count down to 0, commencing at 8, 5, 10, 3, 7, 4, 1, 6, 9, 2. Give the class similar exercises, from time to time, in counting to 20, 30, 40, 50, and so on to 100.

SECTION II.—Before leaving Article A the class should learn and be thoroughly exercised upon the addition and subtraction table 1, page 100; before leaving Article B they should learn table 2, page 100; and before leaving Article C, table 3 page 101. For methods of teaching these tables, see pages 118–120.

(Forms or models of answers and solutions are in italics.)

Page 11.—Ex. 1. *One girl and one girl are two girls.*

Ex. 6. *One girl from two girls leaves one girl.*

Ex. 7. (1.) *There are* 3 *kittens in the picture; because* 2 *kittens and* 1 *kitten are* 3 *kittens.* Or,

(2.) *In the picture are* 2 *kittens and* 1 *kitten, which are three kittens.* Or,

(3.) 2 *kittens and* 1 *kitten are* 3 *kittens. Therefore, there are* 3 *kittens in the picture.*

Page 12.—Ex. 9. (1.) 2 *of the chairs are without arms; because* 1 *chair from* 3 *chairs leaves* 2 *chairs.* Or,

(2.) 2 *chairs from* 3 *chairs leave* 1 *chair. Therefore,* 1 *chair is without arms.* Or,

(3.) *As many of the chairs are without arms as will be left after taking* 2 *chairs from* 3 *chairs, which is* 1 *chair.*

Page 19.—Tables 1, 2, 3, pages 100, 101, should be thoroughly reviewed by the class, before they commence Article E.

SECTION III.—In connection with Article A, require the class to learn table 4, page 101; in connection with Article B, table 5; and in connection with Article C, table 6, page 102.

Page 22.—Ex. 1. (1.) *There are* 7 *boys in that company; because* 4 *boys and* 3 *boys are* 7 *boys.* Or,

(2.) *In that company are* 4 *boys and* 3 *boys, or* 7 *boys.* Or,

(3.) 4 *boys and* 3 *boys are* 7 *boys. Therefore, there are* 7 *boys,* etc.

Ex. 2. (1.) *There is one more boy standing; because* 3 *boys from* 4 *boys leave* 1 *boy.* Or,

(2.) 3 *boys from* 4 *boys leave* 1 *boy. Therefore,* 1 *more boy is standing.* Or,

(3.) *As many more boys are standing as will be left after taking* 3 *boys from* 4 *boys, which is* 1 *boy.*

Page 25.—Ex. 14. Give the pupils clear and distinct ideas of the terms *more* and *less.*

Page 28.—Do not permit the class to pass to Article D until they have thoroughly reviewed tables 4, 5, 6, pages 101, 102.

Page 29.—The combinations in Ex. 6, 7, 8 refer to the picture on page 30; and Ex. 10, 13, 17, 18, page 30, refer to the picture on page 29.

Page 31.—Practice the class in these counting exercises, both in concert and singly, until they can count rapidly, both forward and backward. See page 110.

SECTION IV.—In connection with Articles A, B, C, and D, respectively, the pupils should learn tables 7, 8, 9, 10, pages 102, 103.

Page 33.—Instruct the pupils to make figures of good form and proportions; and when they print or write tables of combinations upon the slate or blackboard, (as directed on page 118,) require them to arrange the numbers in good order in columns and lines. Commend every preceptible improvement, however little it may be.

Page 37.—The class should be masters of tables 7, 8, 9, 10, pages 102, 103, before passing to the next section.

SECTION V.—**Page 38.**—Require the class to review the addition and subtraction tables, pages 100–103, while upon this section.

Each combination in this section occurs twice,—1st, with concrete numbers; 2d, with abstract numbers. The lessons should be recited without the aid of visible objects. In some cases it may be found profitable for the class to pass over this section a second time, without

using the book at recitation; the teacher reading the example or question slowly and distinctly, and then requiring a pupil to reproduce it from memory, and give the solution or answer.

Page 40.—Before commencing Article B, give the class

ORAL EXERCISES.—*Addition.* Name all the pairs of numbers that can be added to form 9. Thus, 8 *and* 1 *or* 1 *and* 8 *are* 9; 7 *and* 2 *or* 2 *and* 7 *are* 9; and so on. In the same manner name all the pairs of numbers that can be added to form 10; to form 11; to form 12; and so on, to 20.

Subtraction. Name all the numbers that can be taken from 9, and also the numbers that will be left. Thus, 1 *from* 9 *leaves* 8, 2 *from* 9 *leave* 7, and so on, to 9 *from* 9 *leave* 0. What numbers can be taken from 10, and what numbers will be left? And so on, to 20.

Page 41.—ARTICLE B. In the same manner teach the pupils to express by figures all the numbers to 100 inclusive.—ARTICLE C. Give the class thorough drills in these counting exercises, in the manner indicated on page 98. Before passing to Section VI, review all the addition and subtraction tables, pages 100–103, as directed on page 119.

SECTION VI.—**Page 42.**—Before assigning lessons in this section to the class, spend the time of one or two recitations in giving oral instruction, with the aid of counters or other visible objects to represent the same combinations as those in Article A. Pursue the same plan, on commencing Article B.

Ex. 1, last question. 2 *times* 1 *camel are* 2 *camels.*

Page 45.—Require the pupils to memorize the multiplication table of 2, page 104, before passing to Article B. For methods of teaching these multiplication and division tables, see page 118–120.

Ex. 15, first question. (1.) *You will have* 18 *chestnuts; because* 2 *times* 9 *chestnuts are* 18 *chestnuts.* Or,

(2.) *You will have* 2 *times* 9 *chestnuts, or* 18 *chestnuts.* Or,

(3.) 2 *times* 9 *chestnuts are* 18 *chestnuts. Therefore, you will have* 18 *chestnuts.* Or,

(4.) *In* 2 *hands you will have* 2 *times as many chestnuts as you have in* 1 *hand, and* 2 *times* 9 *chestnuts are* 18 *chestnuts. Therefore, you will have* 18 *chestnuts.* (Or, omit the last sentence.)

Page 46.—Ex. 6, first question. 8 *marbles are* 4 *times* 2 *marbles.*

Ex. 8. (1.) *You can buy* 5 *peaches; because* 2 *cents are contained in* 10 *cents* 5 *times.* Or,

(2.) 2 *cents are contained in* 10 *cents* 5 *times. Therefore, you can buy* 5 *peaches.* Or,

(3.) *Since you pay* 2 *cents for* 1 *peach, for* 10 *cents you can buy as many peaches as the times* 2 *is contained in* 10, *which is* 5 *times. Therefore, you can buy* 5 *peaches.* (Or, omit the last sentence.) Never use the expression "as many as 2 is contained times in 10."

Page 48.—The division table 2, page 104, is to be learned before passing to Article B. The multiplication and division table 2 should be recited as one table, across the page. See page 118.

Page 49.—At Ex. 6 the process of addition to obtain a product is dropped. Be sure that the manner of obtaining products by repeated additions is fully understood by the pupils. If necessary, continue the method by addition through several more lessons.

Page 52.—Table 3, page 104, is to be learned before passing to the next section.

SECTION VII.—Tables 4 and 5, pages 104, 105, are to be learned in the following order: after Art. A, page 56, multiplication of 4; after Art. B, page 58, division by 4; after Art. C, page 59, multiplication of 5; after Art. D, page 61, division by 5; and with Art. E, pages 61, 62, a thorough review of the tables of 4 and 5, both separately (*i. e.*, multiplication and division each by itself) and conversely (*i. e.*, across the page.)

Page 55.—Make all necessary explanations to the class about the objects mentioned in the examples.

Page 61.—Wherever practicable, exhibit to the class the objects named in the examples. Where this can not be done, make use of counters, and require the pupils to form the combinations.

Page 62. Ex. 17.—Upon the blackboard draw a picture of a barrel. Also, ask the children to look at a flour barrel at home, and see if it has 10 hoops.

SECTION VIII.—**Page 63.**—Pursue the same course in teaching tables 6 and 7, page 105, as you were directed to pursue with tables 4 and 5, above.

SECTION IX.—**Page 68.**—All the combinations in the examples upon this page may be made from the three pictures, by counting the objects named in any example as many times as there are units in the multiplier.

Page 70.—Require the class to thoroughly review the tables of multiplication and division, pages 103–106, both separately and conversely, before leaving this section. Also practice them till they can answer any question of the kind suggested by the following

ORAL EXERCISES.—(1.) Name all the pairs of factors of 12. Thus, 6 *times* 2, *or* 2 *times* 6 *are* 12; 4 *times* 3, *or* 3 *times* 4 *are* 12. Name all the pairs of factors of 15. Of 16. Of 18. Of 20. And so on, with all the composite numbers to 100 inclusive, requiring only those factors that do not exceed 10.

(2.) Name all the divisions and quotients of 12. Thus, 6 *is in* 12 2 *times*, 2 *is in* 12 6 *times*; 4 *in* 12 3 *times*, 3 *in* 12 4 *times*. Name all the divisors and quotients of 15. Of 16. Of 18. Of 20. And so on, with all the composite numbers to 100 inclusive, requiring only those divisors and quotients that do not exceed 10.

(3.) Name all the numbers to 20 inclusive that will contain 2. Thus, 2 *is contained in* 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. In what num-

bers not greater than 30 is 3 contained? And so on, by 10's, to 100 inclusive.

These oral exercises are preparatory to the Factor table, page 107, the memorizing of which should now be commenced. Give the class short exercises upon it daily, till they have thoroughly mastered it. (See directions, page 120.) This will require several weeks, but it will prove to be time well spent.

SECTION X.—**Page 72.**—In these lessons in Fractions, illustrate the first two or three examples in each article by means of objects. After dividing groups of objects—or a single object, as the case may be—before the class, according to the conditions of the question, require the pupils to do the same.

Ex. 1. (1.) *He gave her* 1 *orange; because* 1 *half of* 2 *oranges is* 1 *orange.* Or,
(2.) 1 *half of* 2 *oranges is* 1 *orange. Therefore, he gave her* 1 *orange.*

Page 73.—Ex. 6.—*One half of* 2 *doves is* 1 *dove.*

Ex. 20.—After this example, review the Division table of 2, using the fractional form of expression. Thus, 1 half of 2 is 1, 1 half of 4 is 2, 1 half of 6 is 3, 1 half of 8 is 4, ... 1 half of 20 is 10. Then in reverse order, thus, 1 half of 20 is 10, 1 half of 18 is 9, 1 half of 16 is 8, ... 1 half of 2 is 1. Practice the class upon it till they become familiar with the fractional form of expression.

Page 74.—Illustrate the idea of halves, by dividing an apple, an orange, a peach, a sheet of paper, etc., into two equal parts, before the class, and then fix the idea in the mind of each pupil, by requiring him to perform the division.

Divide 3, 5, 7, and 9 objects before the class, in the manner indicated in the cut and explanation, Ex. 3 and 5.

Ex. 4.—(1.) *Each child will receive* 1½ *pears; because* 1 *half of* 3 *pears is* 1½ *pears;* Or,
(2.) 1 *half of* 3 *pears is* 1½ *pears. Therefore, each child will receive* 1½ *pears.*

Page 76.—Ex. 2.—(1.) *He has* 4 *cents; because* 2 *cents are* 1 *half of* 2 *times* 2 *cents, or* 4 *cents.* Or,
(2.) 2 *cents are* 1 *half of* 2 *times* 2 *cents, or* 4 *cents. Therefore, he has* 4 *cents.*

Ex. 6.—1 *inkstand is* 1 *half of* 2 *times* 1 *inkstand,* or 2 *inkstands.*

Page 77.—Ex. 20. After this example, exercise the class in the formation and memorizing of the first part, *i. e.*, the halves, of the Table of Aliquot, or Fractional Parts, page 107.

ARTICLE D.—Ex. 1. 1½ *peaches are* 1 *half of* 2 *times* 1½ *peaches, or* 3 *peaches.*

Illustrate as follows: (1.) 2 times 1 peach are 2 peaches;
(2.) 2 times 1 half peach are 2 half peaches;
(3.) 2 half-peaches are 1 peach;
(4.) 2 peaches and 1 peach are 3 peaches.

Make this illustration with visible objects, changing the word peach for the names of the objects used. Apply the same method of illus-

tration to developing the idea of $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$, and so on, till the child clearly comprehends, 1st, that $\frac{2}{2}=1$, in any case; 2d, that 2 times $\frac{1}{2}=\frac{2}{2}=1$. Make use of this method or process in illustration, but not in a solution, or as any part of the answer to questions in the article. Pupils should be made so familiar with the method of illustration, that they can apply it to any visible objects, or concrete or abstract numbers, whenever called upon to do so.

Ex. 4 to 9 inclusive. Give the class clear and correct ideas of the denominations foot, yard, and pound, by the aid of visible objects.

Page 78.—Ex. 1. (1.) *There will be* 4 *halves*; *because in* 1 *melon there are* 2 *halves, and* 2 *times* 2 *halves are* 4 *halves.* Or,

(2.) *In* 1 *melon there are* 2 *halves, and in* 2 *melons there are* 2 *times* 2 *halves, or* 4 *halves. Therefore, there will be* 4 *halves.* (Or, omit last sentence.) Or,

(3.) *In* 2 *melons there are* 2 *times as many halves as in* 1 *melon, and* 2 *times* 2 *halves are* 4 *halves. Therefore,* etc., as in (2.)

Ex. 2. (1.) *She had* 2 *sisters; because she had as many sisters as there are halves in an orange, and in an orange there are* 2 *halves.* Or,

(2.) *She had as many sisters as there are halves in an orange, and in an orange there are* 2 *halves. Therefore, she had two sisters.*

Ex. 3. (1.) *I will divide them among* 6 *scholars; because I will give* 1 *pencil to* 2 *scholars, and* 3 *pencils to* 3 *times* 2 *scholars, or* 6 *scholars.* Or,

(2.) *I will give* 1 *pencil to* 2 *scholars, and* 3 *pencils to* 3 *times* 2 *scholars, or* 6 *scholars. Therefore, I will divide them among* 6 *scholars.* (Or, omit last sentence.) Or,

(3.) *I will divide them among as many scholars as there are halves in* 3 *pencils. In* 1 *pencil there are* 2 *halves, and in* 3 *pencils there are* 3 *times* 2 *halves, or* 6 *halves. Therefore, I will divide them among* 6 *scholars.* (Or, omit the last sentence.)

Page 79.—Ex. 2. (1.) 4 *half-apples are equal to* 2 *apples; because* 2 *half-apples are equal to* 1 *apple, and* 2 *halves* (or 2 half-apples) *are contained in* 4 *halves* (or in 4 half-apples) 2 *times.* Or,

(2.) 2 *half-apples are equal to* 1 *apple, and* 2 *halves are contained in* 4 *halves* 2 *times. Therefore,* 4 *half-apples are equal to* 2 *apples.*

Ex. 4. (1.) 4 *pints of ink can be put into* 8 *half-pint bottles; because* 2 *half-pint bottles will hold* 1 *pint, and* 2 *halves are contained in* 8 *halves* 4 *times.* Or,

(2.) 2 *half-pint bottles will hold* 1 *pint, and* 2 *halves are contained in* 8 *halves* 4 *times. Therefore,* 4 *pints of ink can be put into* 8 *half-pint bottles.*

SECTION XI.—**Page 81.**—Ex. 2. (1.) 2 *girls are in the street; because* 1 *third of* 6 *girls is* 2 *girls.* Or,

(2.) 1 *third of* 6 *girls is* 2 *girls. Therefore,* 2 *girls are in the street.*

Ex. 5. (1.) 4 *girls are in the yard; because* 1 *third of* 6 *children is* 2 *children, and* 2 *thirds of* 6 *children are* 2 *times* 2 *children, or* 4 *children.* Or,

(2.) 1 *third of* 6 *children is* 2 *children, and* 2 *thirds of* 6 *children are* 2 *times* 2 *children, or* 4 *children. Therefore,* 4 *girls are in the yard.*

Page 83.—Ex. 8. (1.) *A barrel costs* 18 *dollars*; *because* 6 *dollars is* 1 *third of* 3 *times* 6 *dollars*, *or* 18 *dollars.* Or,

(2.) 6 *dollars is* 1 *third of* 3 *times* 6 *dollars*, *or* 18 *dollars. Therefore, a barrel costs* 18 *dollars.*

Before passing to Article C, drill the class thoroughly upon the division table of 3, both forward and backward, using the fractional form of expression. Thus, 1 third of 3 is 1, 1 third of 6 is 2, 1 third of 9 is 3, ... 1 third of 30 is 10.—1 third of 30 is 10, 1 third of 27 is 9, 1 third of 24 is 8, ... 1 third of 3 is 1.

Also, require the class to memorize the second part (*thirds*) of the Table of Aliquot, or Fractional Parts, page 107, before taking up Article C, or before passing to the next section.

Page 84.—Ex. 2. (1.) 2 *pies can be cut into* 6 *thirds; because in* 1 *pie there are* 3 *thirds, and in* 2 *pies there* 2 *times* 3 *thirds, or* 6 *thirds.* Or,

(2.) *In* 1 *pie there are* 3 *thirds, and in* 2 *pies there are* 2 *times* 3 *thirds, or* 6 *thirds. Therefore,* 2 *pies can be cut, etc.*

SECTION XII.—**Page 86.**—Ex. 13. (1.) *There are* 2 *quarts in* 1 *fourth of a peck; because* 1 *fourth of* 8 *quarts is* 2 *quarts.* Or,

(2.) 1 *fourth of* 8 *quarts is* 2 *quarts. Therefore, there are* 2 *quarts, etc.*

Ex. 14. Teach pupils that 2 fourths of any thing $=\frac{1}{2}$ of the same thing, using for illustration objects that can readily be divided into halves and fourths.

Ex. 18. (1.) *There are* 9 *inches in* 3 *fourths of a foot; because* 1 *fourth of a foot, or* 12 *inches, is* 3 *inches, and* 3 *fourths of a foot are* 3 *times* 3 *inches, or* 9 *inches.* Or,

(2.) *In* 1 *fourth of a foot, or* 12 *inches, there are* 3 *inches, and in* 3 *fourths of a foot there are* 3 *times* 3 *inches, or* 9 *inches.*

Page 88.—Ex. 3. (1.) 1 *pound will cost* 8 *cents; because* 1 *pound will cost* 4 *times as much as* 1 *fourth of a pound, and* 4 *times* 2 *cents are* 8 *cents.* Or,

(2.) 1 *fourth of a pound costs* 2 *cents, and* 4 *fourths, or* 1 *pound, will cost* 4 *times* 2 *cents, or* 8 *cents.*

Before passing to Article C, drill the class upon the division table of 4, both forward and backward, using the fractional form of expression. Thus, 1 fourth of 4 is 1, 1 fourth of 8 is 2, 1 fourth of 12 is 3, ... 1 fourth of 40 is 10.—1 fourth of 40 is 10, 1 fourth of 36 is 9, 1 fourth of 32 is 8, ... 1 fourth of 4 is 1.

Also require the class to memorize the third part (*fourths*) of the Table of Aliquot or Fractional Parts, page 107, and then to review the whole table, across the page, until they are perfect in it, before passing to Article C.

Page 89.—Ex. 3. (1.) 12 *glasses of lemonade can be made from* 3 *lemons; because from* 1 *lemon* 4 *glasses can be made, and from* 3 *lemons* 3 *times* 4 *glasses, or* 12 *glasses, can be made.* Or,

(2.) *From* 1 *lemon* 4 *glasses can be made, and from* 3 *lemons* 3 *times* 4 *glasses, or* 12 *glasses, can be made.*

Page 90.—Ex. 4. (1.) *She used* 4 *yards; because* 16 *times* 1 *fourth of a yard are* 16 *fourths of a yard, or* 4 *yards.* Or,

(2.) 16 *times* 1 *fourth of a yard are* 16 *fourths of a yard, or* 4 *yards. Therefore, she used* 4 *yards.*

SECTION XIII, **page 91**; and SECTION XIV, **page 97.**—Require pupils to learn the tables of Sec. XIV, one at a time, while passing through Sec. XIII. Before assigning a table as a lesson to be learned, explain its uses, and the several denominations, using visible objects in every case where it is practicable. Also require each pupil to handle the weights and measures, and to use them in weighing and measuring various kinds of objects.

SECTION XV.—It is of the first importance to the progress of pupils in a future course of study, that they become perfectly familiar with all the tables contained in this section. To accomplish this, it will be necessary for you to give the class daily exercises upon each table, in order, till they become masters of it, not neglecting frequent reviews of all the tables previously learned. The following course is suggested, as likely to secure the desired result in a manner satisfactory to you, and interesting and profitable to your pupils. We will take for our illustrations of methods, the tables of 4, pages 101-104. The first column of the table of 4, page 101, is the addition to 4 of all numbers not exceeding 10; the second column, the addition of 4 to all numbers not exceeding 10; the third column, the subtraction of all numbers not exceeding 10 from numbers that leave a difference of 4; and the fourth column, the subtraction of 4 from all numbers from 4 to 14, both inclusive.

1. *For Addition.*—Put the first part of the addition table of 4 upon the blackboard, and with the first lesson which you assign in Sec. III, Art. A, page 22, require the class to print or write this part of the table upon their slates, at their seats, say 5 times. In recitation drill them upon it, in concert and singly, (using the methods suggested under Sight Exercises, next page), for say five minutes, daily, until they have learned it. Then assign the second part of the table, and drill the class upon it in the same manner; after which, combine the two parts, requiring the class to recite them as they stand across the table. Thus, 0 *and* 3 *are* 3, 3 *and* 0 *are* 3; 1 *and* 3 *are* 4, 3 *and* 1 *are* 4; 2 *and* 3 *are* 5, 3 *and* 2 *are* 5; 3 *and* 3 *are* 6; 4 *and* 3 *are* 7; 3 *and* 4 *are* 7; and so on.

2. *For Subtraction.*—Pursue the same course with the subtraction table of 4 as above suggested for addition.

3. *For Addition and Subtraction.*—Combine the two tables, requiring the class to recite them as one table, as they stand across the page. Thus, 7 *and* 3 *are* 10, 3 *and* 7 *are* 10; 7 *from* 10 *leave* 3, 3 *from* 10 *leave* 7; and so on, of the whole table.

Keeping pupils employed, for an hour each day, in printing or writ-

ing these tables upon their slates or the blackboard, will be found a valuable aid in fixing the tables in their memories.

4. *For Multiplication and Division.*—Pursue a similar course to that suggested above, for Addition and Subtraction.

Sight Exercises.—To test their knowledge of each table, before leaving it give the class a drill in sight exercises, as follows: We will confine our suggestions to the tables of 4, as before stated.

1. *For Addition.*—Write numbers in pairs—4 being one of the numbers—and call upon the class for their sum. Thus, write $\frac{5}{4}$ $\frac{4}{7}$, and so on, and ask who can give the sum first.

2. *For Subtraction.*—Write numbers in pairs—4 being either subtrahend or remainder, as $\frac{9}{4}$ $\frac{10}{6}$, and call for their difference.

3. *For Multiplication.*—Write two numbers—4 being one of them—as, $\frac{4}{9}$ $\frac{6}{4}$, and call for their product.

4. *For Division.*—Write two numbers, as divisor and dividend—4 being either divisor or quotient—as, *4)28 9)36*, and call for the quotient.

After some practice in this class of exercises, you should then take up the following

Tabular Drills.—1. *For Addition.* Write a column of figures upon the blackboard, as here shown. After the table of 4, page 101, the figures 0, 1, 2, 3, 4, variously arranged, should make up the column; after the table of 5, the column should contain only the figures 0, 1, 2, 3, 4, 5, and so on, of all the tables. The following methods of conducting the exercises will be found valuable:

4
1
3
0
2
3
1
4
2

(1.) Class add in concert, commencing at the foot of the column, and giving results as you point, with an index or pointer, to the numbers: 2, 6, 7, 10, 12, 12, 15, 16, 20.

(2.) Proceed in the same manner, commencing at the top of the column.

(3.) Commence at any place in the column, as at 3, and add up to the top of the column, and then from the bottom, or foot, to the place of starting. Thus, 3, 5, 5, 8, 9, 13 (now at the foot of the column), 15, 19, 20.

(4.) Commencing at the same place, add in the opposite direction.

(5.) Call out a pupil to add before the class, in any of the four methods above described, and require the class to correct his errors.

(6.) Let any pupil, with index in hand, point to the numbers, in any of the orders above enumerated, and the class add in concert.

(7.) In the same manner, let a pupil point to the numbers, and the other pupils, each in turn, name a result.

2. *For Subtraction.*—The sum of the column already written is 20. Now, commencing at the foot of the column, and pointing to the numbers, consecutively, require the class to give (in any of the orders

named for addition) the difference, first between 20 and the first number, then between that difference and the next number, and so on. Thus, you point to 2, 4, 1, and so on, successively, and the pupils instantly answer, 18, 14, 13, 10, 8, 8, 5, 4, 0.

Practice the subtractions by all of the methods given for the addition exercises.

3. *For Multiplication.*—Write promiscuously all the numbers from 0 to 10, both inclusive, in a line upon the blackboard. Thus,

7 1 4 8 0 3 6 10 5 2 9

Then, commencing at the left hand, and pointing successively to the numbers from left to right, require the class to give the product of the number pointed to, by 4. Thus, you point to 7, 1, 4, and so on, and the class instantly answer 28, 4, 16, 32, 0, 12, 24, 40, 20, 8, 36. The exercises may be varied as follows:

(1) Commence at the left hand, and pass toward the right.

(2.) Commence at the right hand, and pass toward the left.

(3.) Commence at any place in the line, and pass in either direction to the end of the line, and then from the opposite end to the place of beginning.

(4.) Point to any number in the line, and the class instantly name the result.

The methods of recitation may also be varied, as suggested under the Sight Exercises, page 119.

4. *For Division.*—Write promiscuously all the exact dividends of 4, to 40, inclusive, in a line upon the blackboard. Thus,

28 4 16 40 0 32 12 20 8 24 36

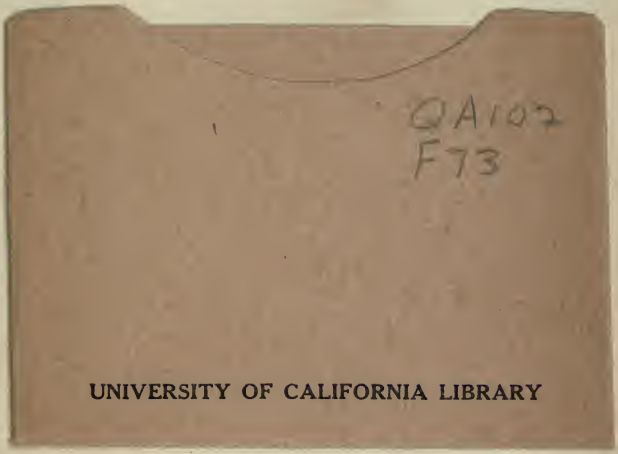
Then, commencing at the left hand, and pointing successively to the numbers from left to right, require the class to name the quotients of the several numbers by 4. Thus, you point to 28, 4, 16, and so on, and the class instantly answer 7, 1, 4, 10, 0, 8, 3, 5, 2, 6, 9.

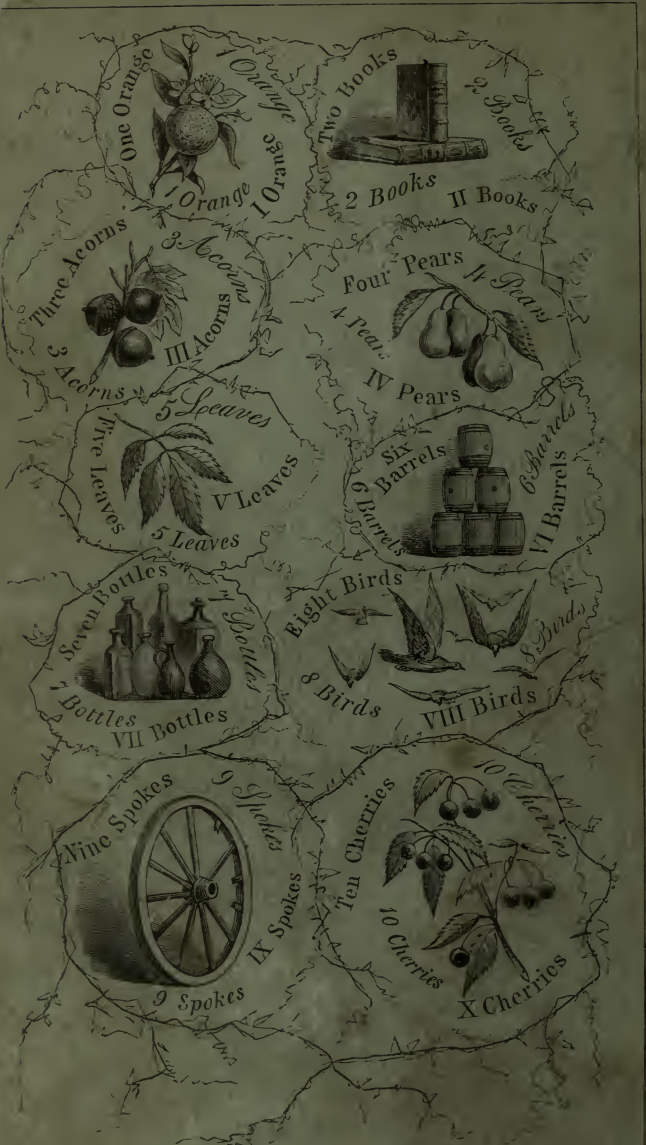
Vary the exercises as just suggested for the exercises in multiplication.

Factor or Division Table.—Assign a portion of this table, say to 20, as a lesson for the pupils to print or write upon their slates, and to memorize at their seats. Then write the numbers in order in a line upon the blackboard, and use them at recitation in any of the methods already described.

After the class can recite the table readily in the order in which it is arranged, write the numbers in a line or a column upon the blackboard, in any order you choose, and drill the class as has already been suggested.

Table of Aliquot or Fractional Parts.—Pursue the same course with pupils while learning this table, that has been indicated for the other tables in this section.




One Orange
1 Orange
1 Orange
1 Orange
Two Books
2 Books
2 Books
II Books
Three Acorns
3 Acorns
III Acorns
3 Acorns
Four Pears
4 Pears
IV Pears
Five Leaves
5 Leaves
V Leaves
5 Leaves
Six Barrels
6 Barrels
6 Barrels
VI Barrels
Seven Bottles
7 Bottles
7 Bottles
VII Bottles
Eight Birds
8 Birds
8 Birds
VIII Birds
Nine Spokes
9 Spokes
9 Spokes
IX Spokes
Ten Cherries
10 Cherries
X Cherries