

Johnson's  
Common School  
Arithmetic.

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Raleigh, N.C.  
Branson & Farrar,  
Fayetteville Street

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1864

Elementary  
Arithmetic,  
Designed  
For Beginners:  
Embracing  
The First Principles  
of  
The Science.

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Raleigh, N.C.,  
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## Preface.

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The great demand at this time for books of an elementary character in the Southern Confederacy, has called forth this little volume. Nothing new or original has been attempted. The method of presenting the subject to the youthful mind, is such as, after several years spent in the recitation room, we believe to be best.

The necessity of mental exercises at first, in order to strengthen the mind, and enable it to comprehend rules and principles, is obvious to every person who has been engaged in the instruction of youth. The compass of this work is such that it can be thoroughly learned by the youth of either sex, before their presence at home, or the demands of their country debar them the privilege of attendance at school.

Should these pages be deemed suitable, by an intelligent and discriminating public, for an introduction into our primary schools, we promise shortly a work of higher grade, embracing all the modern improvements in the science of Arithmetic.



Mental Arithmetic.



Numeration.

- |          |               |
|----------|---------------|
| 1. one   | 11. eleven    |
| 2. two   | 12. twelve    |
| 3. three | 13. thirteen  |
| 4. four  | 14. fourteen  |
| 5. five  | 15. fifteen   |
| 6. six   | 16. sixteen   |
| 7. seven | 17. seventeen |
| 8. eight | 18. eighteen  |
| 9. nine  | 19. nineteen  |
| 10. ten  | 20. twenty    |



Addition.



Section. I.

1. How many thumbs have you on your right hand. How many thumbs on your left hand? How many thumbs have you on both hands? 1 and 1 are how many?
2. James had 1 apple and William gave him 2 more. How many apples did James then have? 1 and 2 are how many?

3. John had 1 chestnut and his brother gave him 3 more. How many chestnuts had John then? 1 and 3 are how many?
4. Your brother gave you 1 pear and your sister gave you 4 more. How many pears did you then have? 1 and 4 are how many?
5. Sarah was feeding 1 little chicken and 5 more came and ate with them. How many chickens were there then? 1 and 5 are how many?
6. One little girl was sitting on a bench and 6 other girls came and sat with her. How many girls were then on the bench? 1 and 6 are how many?
7. One boy was playing hoop and 7 more joined him. How many were now playing? 1 and 7 are how many?
8. Quincy had 1 melon and Joshua gave him 8 more. How many melons did Quincy then have? 1 and 8 are how many?
9. Netty had 1 bead and her aunt Mary gave her 9 more .How many beads did she then have? 1 and 9 are how many?

Recite Table 1.

1 and 1 are 2

1 and 2 are 3

1 and 3 are 4

1 and 4 are 5

1 and 5 are 6

1 and 6 are 7

1 and 7 are 8

1 and 8 are 9

1 and 9 are 10

1 and 10 are 11.

Section II.

1. Madison had 2 pigs and Leroy gave him 2 more. How many pigs had Madison then? 2 and 2 are how many?
2. Alfred had 3 quills and Alphonso gave him 2 more. How many quills did Alfred then have? 2 and 3 are how many?

3. 2 nails are lying on the floor and 4 more close by. How many nails are on the floor? 2 and 4 are how many?
4. 5 cherries are on one branch and 2 on another. How many cherries are there on both? 2 and 5 are how many?
5. If 2 inkstands are sitting in one row and 6 in an other. How many are there in both rows? 2 and 6 are how many?
6. 2 acorns are standing on end and 7 are lying down. How many acorns are there? 2 and 7 are how many?
7. 2 pigs are in one pen and 8 in another. How many pigs are there in both pens? 2 and 8 are how many?
8. If there are 2 sheep in one fold and 9 in another. How many are there in both? 2 and 9 are how many?
9. 2 boys were playing ball and 10 more came and played with them. How many were then playing ball? 2 and 10 are how many?

Recite Table 2.

2 and 1 are 3,  
2 and 2 are 4,  
2 and 3 are 5,  
2 and 4 are 6,  
2 and 5 are 7,

2 and 6 are 8,  
2 and 7 are 9,  
2 and 8 are 10,  
2 and 9 are 11,  
2 and 10 are 12.

Section III.

1. 3 birds are in one bush and 3 in another. How many are there in both? 3 and 3 are how many?
2. 3 marbles are in the ring and 4 have been knocked out. How many marbles are there in all? 3 and 4 are how many?
3. 3 pumpkins are on one vine and 5 on another. How many are there on both? 3 and 5 are how many?



4. If 3 bars are down and 6 up, how many bars are there in all? 3 and 6 are how many?
5. If 3 birds are on a tree and 7 on the ground, how many birds are there? 3 and 7 are how many?
6. If 3 ladies are knitting and 8 sewing in the same room, how many ladies in all? 3 and 8 are how many?
7. If 3 girls are jumping rope and 9 other girls join in the sport, how many girls are then in the company? 3 and 9 are how many?
8. 3 jars have cider in them and 10 have vinegar. How many jars are there of both kinds? 3 and 10 are how many?

Recite Table 3.

3 and 1 are 4,  
 3 and 2 are 5,  
 3 and 3 are 6,  
 3 and 4 are 7,  
 3 and 5 are 8,

3 and 6 are 9,  
 3 and 7 are 10,  
 3 and 9 are 12,  
 3 and 10 are 13.

Section IV.

1. 4 posts are standing in one row, and 4 in another. How many are there in both rows? 4 and 4 are how many?
2. A farmer had 4 axes with handles in them and 5 without handles. How many axes had he? 4 and 5 are how many?
3. If you have 5 cents and your father gives you 6 more, how many do you now have? 4 and 6 are how many?
4. Gave 4 dollars for a knife and 7 dollars for a pair of shoes. What did they both cost? 4 and 7 are how many?
5. If you have 4 tame squirrels and you brother has 8 more, how many have you both? 4 and 8 are how many?

6. Charles had 4 fish-hooks and bought 9 more. How many fish-hooks had he then? 4 and 9 are how many?
7. Isaac caught 4 snow-birds in one trap and 10 in another. How many birds did he catch in both? 4 and 10 are how many?

Recite Table 4.

4 and 1 are 5,	4 and 6 are 10,
4 and 2 are 6,	4 and 7 are 11,
4 and 3 are 7,	4 and 8 are 12,
4 and 4 are 8,	4 and 9 are 13,
4 and 5 are 9,	4 and 10 are 14.

Section V.

1. If you have 5 toes on your right foot and 5 on your left, how many have you on both? 5 and 5 are how many?
2. A gentleman sold 5 guns to one man and 6 to another. How many guns did he sell to both? 5 and 6 are how many?
3. If you say 5 lessons one day and 7 the next, how many lessons do you recite both days? 5 and 7 are how many?
4. Henry caught 5 fishes in the morning and 8 in the evening. How many did he catch during the day? 5 and 8 are how many?
5. If 5 pear trees are standing in one row and 9 in another, how many are there in both? 5 and 9 are how many?
6. 5 soldiers are in one tent and 10 in another. How many soldiers are there in both? 5 and 10 are how many?

Recite Table 5.

5 and 1 are 6,	5 and 6 are 11,
5 and 2 are 7,	5 and 7 are 12,
5 and 3 are 8,	5 and 8 are 13,
5 and 4 are 9,	5 and 9 are 14,
5 and 5 are 10,	5 and 10 are 15.

1. Jacob had 6 sheets of paper and John gave him 6 more. How many sheets did Jacob then have? 6 and 6 are how many?
2. Edward has cracked 6 walnuts and has 7 more to crack. How many walnuts had he? 6 and 7 are how many?
3. If you find 6 plums on the ground and 8 on a tree, How many plums have you? 6 and 8 are how many?
4. If you have 6 buttons on your vest and 9 on your coat, how many have you on both? 6 and 9 are how many?
5. Susan gathered 6 cucumbers and Ann gathered 10. How many cucumbers did both gather? 6 and 10 are how many?

Recite Table 6.

6 and 1 are 7,  
6 and 2 are 8,  
6 and 3 are 9,  
6 and 4 are 10,  
6 and 5 are 11,

6 and 6 are 12,  
6 and 7 are 13,  
6 and 8 are 14,  
6 and 9 are 15,  
6 and 10 are 16.

Section VII.

1. If you have 7 pence and your father should give you 7 more, how many would you then have? 7 and 7 are how many?
2. Delphina bought a paper of pins for 7 cents and a piece of tape for 8 cents. How many cents did both cost? 7 and 8 are how many?
3. Josephine had 7 needles and Maria 9. How many needles had they both? 7 and 9 are how many?
4. If a bushel of wheat cost 7 dollars and a tone of coal 10 dollars. How many dollars do both cost? 7 and 10 are how many?

Recite Table 7.

7 and 1 are 8,  
7 and 2 are 9,  
7 and 3 are 10,  
7 and 4 are 11,  
7 and 5 are 12,

7 and 6 are 13,  
7 and 7 are 14,  
7 and 8 are 15,  
7 and 9 are 16,  
7 and 10 are 17.

Section VIII.

1. There are two classes in school; in the first class there are 8 boys, and in the second 8. How many boys are there in school? 8 and 8 are how many?
2. If I pay 8 dollars for a barrel of flour, then 9 dollars for a barrel of sugar, what do both cost me? 8 and 9 are how many?
3. John gave 8 dollars for a watch and 10 dollars for a chain. How many dollars did he spend? 8 and 10 are how many?

Recite Table 8.

8 and 1 are 9,  
8 and 2 are 10,  
8 and 3 are 11,  
8 and 4 are 12,  
8 and 5 are 13,

8 and 6 are 14,  
8 and 7 are 15,  
8 and 8 are 16,  
8 and 9 are 17,  
8 and 10 are 18.  
9 and 10 are 19.

Numeration.  
Section 9.

You have learned to count and combine numbers as high as twenty. You must now learn to count to one hundred.

20 twenty,

21 twenty-one,

22 twenty-two,

23 twenty-three,

24 twenty-four,

25 twenty-five,

26 twenty-six,

27 twenty-seven,

28 twenty-eight,

29 twenty-nine,

30 thirty,

31 thirty-one,

32 thirty-two,

33 thirty-three,

34 thirty-four,

35 thirty-five,

36 thirty-six,

37 thirty-seven,

38 thirty-eight,

39 thirty-nine,

40 forty,

41 forty-one,

42 forty-two,

43 forty-three,

44 forty-four,

45 forty-five,

46 forty-six,

47 forty-seven,

48 forty-eight,

49 forty-nine,

50 fifty,

51 fifty-one,

1. How many ones are there in ten?

2. How many tens are there in a hundred?

3. In fifty how many tens?

4. If 2 tens are twenty, how many are 3 tens? 4 tens? 5 tens? 6 tens? &c.

52 fifty-two,

53 fifty-three,

54 fifty-four,

55 fifty-five,

56 fifty-six,

57 fifty-seven,

58 fifty-eight,

59 fifty-nine,

60 sixty,

61 sixty-one,

62 sixty-two,

63 sixty-three,

64 sixty-four,

65 sixty-five,

66 sixty-six,

67 sixty-seven,

68 sixty-eight,

69 sixty-nine,

70 seventy,

71 seventy-one,

72 seventy-two,

73 seventy-three,

74 seventy-four,

75 seventy-five,

76 seventy-six,

77 seventy-seven,

78 seventy-eight,

79 seventy-nine,

80 eighty,

81 eighty-one,

82 eighty-two,

83 eighty-three,

84 eighty-four,

85 eighty-five,

86 eighty-six,

87 eighty-seven,

88 eighty-eight,

89 eighty-nine,

90 ninety,

91 ninety-one,

92 ninety-two,

93 ninety-three,

94 ninety-four,

95 ninety-five,

96 ninety-six,

97 ninety-seven,

98 ninety-eight,

99 ninety-nine,

100 one hundred.

5. What figures stand to represent the number ten? Answer. 1 and 0, naught or ciphers.
6. What figures stand to represent one hundred?
7. Count to one hundred by tens; thus, 10 and 10 are 20, and 10 are 30, and 10 are 40, &c.
8. Count to 100 by fives; thus 5 and 5 are 10, and 5 are 15, and 5 are 20, &c.
9. Count to 100 by twos; thus 2 and 2 are 4, and 2 are 6, and 2 are 8, and 2 are 10, &c.
10. If you should have 100 marbles, and your brother gave you 1 more, how many marbles would you then have?
11. Numbers from one hundred to two hundred are expressed as follows:

100 one hundred,  
101 one hundred and one,  
102 one hundred and two,  
103 one hundred and three,  
104 one hundred and four,  
105 one hundred and five,  
106 one hundred and six,  
107 one hundred and seven,  
108 one hundred and eight,  
109 one hundred and nine,  
110 one hundred and ten,  
111 one hundred and eleven,  
112 one hundred and twelve,  
113 one hundred and thirteen,  
114 one hundred and fourteen,  
115 one hundred and fifteen,  
116 one hundred and sixteen,  
117 one hundred and seventeen,  
118 one hundred and eighteen,  
119 one hundred and nineteen,  
120 one hundred and twenty,  
121 one hundred and twenty-one,  
122 one hundred and twenty-two,  
123 one hundred and twenty-three,  
130 one hundred and thirty,  
140 one hundred and forty,  
150 one hundred and fifty,  
160 one hundred and sixty,  
170 one hundred and seventy,  
180 one hundred and eighty,  
190 one hundred and ninety,  
200 two hundred.

Addition.



Section XI.

1. If 1 and figure called nought or cipher 0, represent ten, what will represent twenty? what thirty? what forty? what eighty?
2. If 1 with two ciphers represent one hundred, what will 2 with two ciphers represent? 3 with two ciphers? 4 with two ciphers? 8 with two ciphers?
3. What do you call 2 tens? 3 tens? 4 tens? 6 tens?
4. What do you call 10 tens? 20 tens? 30 tens? 40 tens?
5. What do you call 1 hundred and 2 tens? 1 hundred and 5 tens?
6. What do you call 2 tens and 8? 4 tens and 6? 8 tens and 2? 9 tens and 9? 10 tens and 10?
7. What do you call 2 hundreds, 5 tens and 6? 3 hundreds, 8 tens and 7?
8. What do you call 9 hundreds, 9 tens and 9?
9. If to the number 999 you add 1, what does it become? Answer. 1000.

Section XII.

1. A boy sold a pig for 3 dollars, and a calf for 5 dollars. How many dollars did he receive for both? Solution – He received as many dollars as 3 dollars and 5 dollars, which are 8 dollars.
2. A merchant bought 3 barrels of flour from one man, and 8 barrels from another; how many barrels did he buy from both?
3. If I give you 7 chestnuts and Sarah gives you 5 more, how many chestnuts will you then have?
4. If William give you 7 marbles and Sidney give you 4 more, how many marbles will you then have?
5. Anna and Amanda went to pick strawberries. Anna

- picked 4 pints and Amanda 6. How many pints did they both pick?
6. A farmer sold 9 cows to one man and 8 to another. How many cows did he sell?
  7. John gave 9 cents for a knife and had 7 cents left. How many cents had he at first?
  8. If a baker give 9 dollars for a bushel of wheat and 10 dollars for a bushel of corn, how many dollars do they both cost?
  9. A farmer paid 9 dollars for a harrow and 9 for a plow. How many dollars did he pay for both?

### Section XIII.

1. A traveller gave 20 cents for breakfast and 10 cents for some apples. How many cents did he pay for both? Solution – 2 tens and 1 ten are 3 tens and 3 tens are 30.
2. A farmer kept 30 hogs in one field and 20 in another. How many hogs had he in both fields?
3. In an orchard there are 30 plum trees and 40 pear trees. How many trees in the orchard?
4. Ellen had 50 cents and her mother gave her 30 more. How many cents had Ellen then?
5. A farmer who had 50 sheep purchased 50 more. How many sheep had he then?
6. A farmer sold 100 bushels of rye to one man and 20 bushels to another. How many bushels did he sell? Solution – 100 is the same as 10 tens, and 20 the same as 2 tens; 10 tens and 2 tens are 12 tens: and 12 tens are 120.
7. If 60 persons enter a church at one door and 40 persons at another, how many would there be in the church?
8. 6 and 4 are how many? 6 tens and 4 tens?
9. How many gallons of molasses are there in two barrels; there being 70 gallons in one and 10 gallons in the other?
10. 90 soldiers are in one company, and 20 in another. How many soldiers are there in both?
11. How many students are there in a school consisting of 80 boys and 60 girls?



12. If you pay 90 cents for a spelling book and 50 cents for a reader, what do they both cost?
13. If you read 80 pages in the North Carolina Reader, and 70 pages in Our Own Reader, How many pages have you read?
14. How many are 7 and 8? 7 tens and 8 tens?
15. A farmer mixed 90 bushels of wheat with 90 bushels of corn. How many bushels were there of the mixture?
16. How many are 9 and 9? 9 tens and 9 tens?
17. James gave 100 cents for a pair of gloves and 90 cents for a handkerchief. How many cents did he pay for them both?
18. A captain of cavalry paid 100 dollars for a horse and 100 more for a pistol; how many dollars did both cost him?

#### Section XIV.

1. A market man received 10 dollars for butter, 10 dollars for fruit, and 10 for cheese. How many dollars did he receive for the whole? Solution 0 10 and 10 are 20, and 10 are 30.
2. A farmer purchased 20 dollars worth of iron, 10 dollars worth of sugar, and 30 dollars worth of coffee. How many dollars worth did he purchase?
3. If I pay 50 dollars to one man, 49 to another, and 30 to another, how many dollars do I pay out?
4. A man travelled 60 miles the first day, 50 miles the second, and 70 the third. How many miles did he travel during the three days?
5. How many are 6 and 5 and 7? 6 tens, 5 tens, and 7 tens?
6. Joshua caught 90 fishes, Madison caught 80 and Leroy 20. How many fishes did they all catch?
7. Robert shot 20 black-birds, George shot 30 larks, and and Jesse shot 9 pigeons. How many birds did they all shoot? Solution – 20 and 30 are 50, and 9 are 59.
8. If a gold watch cost 60 dollars, the chain 40 dollars and guard 8 dollars, how many dollars do they all cost?

9. Andrew gave 90 cents for a pen-knife, 70 cents for a pair of shoes, and 6 cents for a comb. What did he pay for all?
10. A lady gave 80 dollars for a shawl, 50 dollars for a bonnet, and 5 dollars for a pair of gloves. How much did she pay for all?
11. If a quire of paper cost 70 cents, and ink-stand 50 cents and a pencil 10, how many cents do they all cost?
12. Thomas wrote 70 lines in the forenoon and 60 in the afternoon. How many lines did he write?

#### Section XV.

1. A young man entered school at the age of 10 years, and remained in school 5 years. At what age did he leave school?
2. A wagoner drove 10 miles before noon and 7 miles in the afternoon. How many miles did he drive during the day?
3. A man lost 10 dollars and had 15 dollars left. How many dollars had he before he lost any?
4. Clark had 20 books and his father gave him 4 more. How many books had Clark then?
5. If a clock cost 25 dollars and a looking-glass 10 dollars, how many dollars do both cost?
6. Charles has 25 cents and John has 15; if they should each one of them get 20 cents more, how many cents would each one then have?
7. Isabella gathered 25 white roses and 45 red ones. How many roses had she then?
8. Erastus went out to shoot birds: he shot 50 partridges and 45 snipes. How many birds did he shoot of both kinds?

## Subtraction.

### Section 1.

1. If you have 1 knife in your pocket and were to lose it, what would be left in your pocket? 1 from 1 leaves what?
2. 2 trees were standing near each other, but the wind blew one of them down: how many were left standing? 1 from 2 leaves how many?
3. If 3 bottles were standing up and you should knock one of them down, how many would be left standing up? 1 from 3 leaves how many?
4. 4 hoops were rolling on the ground, but 1 of them fell down; how many were still rolling? 1 from 4 leaves how many?
5. If 5 marbles were in a ring and you should knock 1 out, how many would be left in the ring? 1 from 5 leaves how many?
6. If 6 chimpanzees are on a bush and 1 of them should drop off, how many would be left on the bush? 1 from 6 leaves how many?
7. Delphina was feeding 7 little chickens, when a hawk came and carried 1 of them away. How many chickens were left? 1 from 7 are how many?
8. Thomas raised 8 bushels of potatoes and gave 1 bushel to a poor boy. How many bushels had he left? 1 from 8 leaves how many?
9. Harriet bought 9 needles at a store and lost 1 of them as she went home. How many needles did she then have? 1 from 9 leaves how many?
10. Franklin made 10 bushels of salt and sold 1 bushel to

a soldier's wife. How many bushels of salt did he then have? 1 from 10 leaves how many?

Recite Table 1.

1 from 1 leaves 0,	1 from 6 leaves 5,
1 from 2 leaves 1,	1 from 7 leaves 6,
1 from 3 leaves 2,	1 from 8 leaves 7,
1 from 4 leaves 3,	1 from 9 leaves 8,
1 from 5 leaves 4,	1 from 10 leaves 9.

Section II.

1. If 2 tin cups are on the table and Amelia knocks them both off, what is left on the table? 2 from 2 leave how many?
2. 3 birds were sitting on a gate and 2 of them flew away. How many birds remained on the gate? 2 from 3 leave how many?
3. Frances had 4 beads and gave 2 to her sister. How many beads did Frances then have? 2 from 4 are how many?
4. Augusta had 5 pins and gave 2 to Ellen. How many pins did Augusta then have?
5. 6 boys came to recite, but 2 of them were sent back for ill behavior. How many remained to recite? 2 from 6 leave how many?
6. If 7 chickens were in a coop and 2 of them get out, how many would still be in the coop? 2 from 7 leave how many?
7. If you have 8 cents and pay 2 cents for a pencil, how many cents will you still have? 2 from 8 are how many?
8. Joseph had 9 books and sold 2 to his classmate. How many books had he then? 2 from 9 are how many?
9. 10 boys were at school in the morning, and 2 of them

went home at noon. How many were in school during the evening? 2 from 10 leave how many?

RECITE TABLE 2.

2 from 2 leave 0,	2 from 7 leave 5,
2 from 3 leave 1,	2 from 8 leave 6,
2 from 4 leave 2,	2 from 9 leave 7,
2 from 5 leave 3,	2 from 10 leave 8,
2 from 6 leave 4,	2 from 11 leave 9.

SECTION III.

1. 3 trees were standing in a row and the wind blew the three down. How many were left standing? 3 from 3 leave how many?
2. 4 glasses were standing on the table and Sarah turned 3 of them over. How many were standing? 3 from 4 leave how many?
3. 4 black birds were sitting on a tree and James scared 3 of them away. How many black-birds remained on the tree.
4. Josiah bought 6 sticks of candy and gave 3 sticks to his brother. How many sticks did he keep? 3 from 6 leave how many?
5. Henry bought a knife having 7 blades in it and soon after broke 3 of them out. How many blades remained in the knife? 3 from 7 leave how many?
6. If you have 8 fingers on both hands and should cut of them off, how many fingers would be left? 3 from 8 leave how many?
7. If 9 men were crossing a river and 3 fell in and got drowned, how many were saved?
8. Milton bought 10 marbles and gave 3 to William; how many marbles did Milton then have? 3 from 10 leave how many?

RECITE TABLE 3.

3 from 3 leave 0,	3 from 8 leave 5,
3 from 4 leave 1,	3 from 9 leave 6,
3 from 5 leave 2,	3 from 10 leave 7,
3 from 6 leave 3,	3 from 11 leave 8,
3 from 7 leave 4,	3 from 12 leave 9.

Section IV.

1. Andrew caught 4 partridges in a trap, and in attempting to get them out, 4 of them escaped. What remained in the trap? 4 from 4 leave what?
2. Eliza had 5 tea-spoons with handles on them, and Augusta broke the handles off of 4 of them; how many remained with handles on them?
3. 6 acorns were on one twig and the wind blew 4 of them off. How many remained on the twig? 4 from 6 leave how many?
4. Hannah bought 7 thimbles and gave away 4. How many thimbles had she then? 4 from 7 leave how many?
5. Alfred bought 8 oranges and Silas 4. How many more oranges did Alfred buy than Silas? 4 from 8 leave how many?
6. If 9 girls were sitting on a bench and 4 go to recite, how many are left on the bench?
7. You have 10 fingers and thumbs on both hands, and if by accident you cut off 4, how many will remain? 4 from 10 leave how many?

Recite Table 4.

4 from 4 leave 0,	4 from 9 leave 5,
4 from 5 leave 1,	4 from 10 leave 6,
4 from 6 leave 2,	4 from 11 leave 7,
4 from 7 leave 3,	4 from 12 leave 8,
4 from 8 leave 4,	4 from 13 leave 9.

### Section V.

1. If 5 glass tumblers are sitting on the table, and Louisa takes the five away, what remains on the table? 5 from 5 leave how many?
2. If you have 6 cannon balls in your room and you roll 5 of them out, how many are still in your room? 5 from 6 leave how many?
3. Your brother gave you 7 figs and you give 5 to your sister. How many figs have you left? 5 from 7 are how many?
4. Albert purchased 8 finger rings and gave 5 to Robert. How many did Albert then have? 5 from 8 are how many?
5. Emily purchased 9 combs and gave 5 to her sister Grace. How many combs did she keep? 5 from 6 are how many?
6. If 10 melons were on a vine and you should pull off 5, how many would remain on the vine? 5 from 10 leave how many?

### Recite Table 5.

5 from 5 leave 0,	5 from 10 leave 5,
5 from 6 leave 1,	5 from 11 leave 6,
5 from 7 leave 2,	5 from 12 leave 7,
5 from 8 leave 3,	5 from 13 leave 8,
5 from 9 leave 4,	5 from 14 leave 9.

### Section VI.

1. If you have 6 apples and give your little brother 6, how many will you have left? 6 from 6 leave what?
2. 7 tops were spinning on the floor; when 6 of them stopped, how many remained spinning? 6 from 7 leave how many?
3. A merchant bought 8 barrels of flour and sold two of them, how many had he then remaining? 6 from 8 leave how many?

4. Henry had 9 quills and gave away 6 of them for apples. How many quills had Henry then? 6 from 9 leave how many?
5. If I had 10 pens and should give you 6 of them, how many pens would I then have? 6 from 10 leave how many?

Recite Table 6.

6 from 6 leave 0,	6 from 11 leave 5,
6 from 7 leave 1,	6 from 12 leave 6,
6 from 8 leave 2,	6 from 13 leave 7,
6 from 9 leave 3,	6 from 14 leave 8,
6 from 10 leave 4,	6 from 15 leave 9.

Section VII.

1. A ship's crew consisted of 8 men and 7 of them were drowned while at sea. How many escaped? 7 from 8 leave how many?
2. Lucy had 9 pins and lost 7 of them. How many remained? 7 from 9 leave how many?
3. 10 pears grew upon a tree and a boy knocked 7 of them off. How many are still upon the tree? 7 from 10 leave how many?
4. If 11 peaches were upon a tree and the wind should blow 7 of them off, how many would remain on the tree? 7 from 11 leave how many?
5. Martha is 12 years old and Jane is 7. What is the difference of their ages? 7 from 12 leave how many?
6. In a class of 13 boys 7 recited well. How many recited badly? 7 from 13 leave how many?

Recite Table 7.

7 from 7 leave 0,	7 from 12 leave 5,
7 from 8 leave 1,	7 from 13 leave 6,
7 from 9 leave 2,	7 from 14 leave 7,
7 from 10 leave 3,	7 from 15 leave 8,
7 from 11 leave 4,	7 from 16 leave 9.



### Section VIII.

1. 9 men went to an election and 8 of them returned without voting. How many voted? 8 from 9 leave how many?
2. In a certain school there were 10 girls and 8 boys. How many girls were there more than boys? 8 from 10 leave how many?
3. Bartlett had 11 peaches and gave 8 to his mother. How many peaches had he left? 8 from 11 leave how many?
4. If 12 potatoes were in the fire a roasting and 8 of them should get burnt, how many would be saved? 8 from 12 leave how many?
5. Isaiah bought 13 steel pens and gave 8 to Thomas. How many pens did Isaiah have left? 8 from 13 leave how many?
6. Ann purchased 14 pins and lost 8 of them. How many pins did Ann have left? 8 from 14 leave how many?

### Recite Table 8.

8 from 8 leave 0,	8 from 13 leave 5,
8 from 9 leave 1,	8 from 14 leave 6,
8 from 10 leave 2,	8 from 15 leave 7,
8 from 11 leave 3,	8 from 16 leave 8,
8 from 12 leave 4,	8 from 17 leave 9.

### Section IX.

1. 10 persons went a fishing: 9 of them caught fish. How many caught nothing? 9 from 10 leave how many?
2. In a class at school, there were 11 scholars; 9 of them were lazy. How many were studious? 9 from 11 leave how many?
3. William picked 12 strawberries and ate 9. How many did he keep to eat again? 9 from 12 leave how many?

- Sarah had 13 plums and gave George 9. How many plums had Sarah then? 9 from 13 leave how many?
- Richard had 14 marbles and gave 9 to John. How many did Richard then have? 9 from 14 leave how many?

Recite Table 9.

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

Section 10.

- Joseph's father gave him 20 cents to buy a book, but he obtained the book for 10 cents; how many cents did Joseph save? Solution - 1 ten from 2 tens leave 1 ten. Answer 10 cents.
- Edward is 30 years old; his father died when he was 20; how many years is it since his father died?
- Sarah paid 30 cents for a book, and she had 50 cents before she purchased it. How many cents had Sarah left? 3 from 5 leave how many? 3 tens from 5 tens?
- A man received 70 dollars for work and paid 30 dollars for his board. How many dollars did he save?
- A man who had 80 dollars paid 50 dollars for a pair of boots. How many dollars had he left?
- A person who had 90 dollars on hand lent 40 dollars to his friend. How many dollars had he left? 4 from 9? 4 tens from 9 tens? 40 from 90?
- A farmer who had 60 acres of land sold 30. How many acres did he then have?
- A farmer who had 40 sheep sold 20 of his flock. How many sheep had he left?
- James read 40 pages in a book that contained 100 pages. How many pages remained to be read? 4 from 10? 4 tens from 10 tens? 40 from 100?

10. A woman had 60 oranges and sold 50 of them. How many oranges had she left?
11. If your lesson for the day is 90 questions and your answers 70, how many questions do you miss?
12. A company of 100 men fell into an engagement in which 50 of them were killed. How many escaped?
13. Count from 100 down by tens; thus 10 from 100 leave 90, 10 from 90 leave 80, 10 from 80 leave 70, &c.

#### Section XI.

1. If you had 25 chestnuts and should sell 5 of them, how many chestnuts would you have left? How many are 20 and 5? 5 from 25 leave how many?
2. Charles had 30 cents and gave 5 cents for a pencil. How many cents had he left? How many are 25 and 5? 5 from 30 leave how many?
3. Harriet bought 35 pins and sold 5. How many pins had she left? 30 and 5 are how many? 5 from 35?
4. Caroline answered 40 questions and George answered 5. How many more questions did Caroline answer than George? How many are 35 and 5? 5 from 40?
5. Leonard has 45 cents and he wishes to buy a book that will cost 5 cents. How much money will he have left when he buys the book? 40 and 5 are how many? 5 from 45?
6. A farmer who had 20 hogs sold 15 of them. How many had he left? 15 and 5 are how many? 15 from 20?
7. Oliver gave 35 cents for a Geographical reader and 25 for an Arithmetic. How much did one cost more than the other? How many are 25 and 10? 25 from 35?
8. A slate cost 55 cents and a quire of paper 35. How much more does the slate cost than the paper? 35 and 20 are how many? 35 from 55?
9. A merchant who had 65 dollars paid a debt and then had 50 dollars left; how many dollars did he pay? 50 and 15 are how many? 50 from 65?

10. A drover was driving 85 cattle to market and 55 of them died on the way, how many remained for sale? How many are 55 and 35? 55 from 85?

### Section XII.

1. Sylvester raised 19 melons and sold 10 of them; how many did he keep?
2. Enoch had 23 dollars and paid 5 dollars for a pair of boots; how many dollars had he left?
3. Linden had 38 cents and lost 7; how many cents had he then?
4. Edward gave 18 dollars for a hat and 8 for a vest. How much more did the hat cost than the vest?
5. A regiment of soldiers marched 21 miles the first day and 11 the second; how much farther did they march the first day than the second?
6. Amos is 33 years old and Emily 7; how much older is Amos than Emily?
7. A merchant purchased 58 barrels of sugar and sold 6 barrels of it before he reached home; how many barrels had he left?
8. Alvin read 29 pages of history and 20 pages of philosophy; how many more pages of history did he read than philosophy?
9. In a certain school there were 46 scholars; 30 of them were studying the languages, how many were not?
10. In a certain school there were 100 students of whom 9 were little boys; how many were girls?
11. A butcher who had 47 head of cattle killed 8 of them. How many had he left?
12. If your father should give you 63 cents and your mother 10, and you should then lay out 6 cents for a whistle, how much money would you have then?
13. If I have 80 dollars and pay out 20 dollars to one man, 30 dollars to another, and 5 to another, how many dollars would I have left?

## Multiplication.

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1. If your father gave you 1 orange and your mother 1, how many oranges would you then have?
2. If your uncle gave you 2 apples before noon and 2 in the evening, how many apples would you then have? How many are 2 and 2 or 2 times 2?
3. Your brother gave you 3 cents and your sister 3. How many cents did you then have? How many are 3 and 3 or 3 times 2?
4. Hannah read 4 pages in her new book and 4 in her old one. How many pages did she read in both? How many are 4 and 4 or twice 4?
5. Jesse caught 5 snow-birds in one trap and 5 in another. How many did he catch in both? How many are 5 and 5 or twice 5?
6. John killed 6 squirrels one day and 6 another. How many did he kill both days? How many are 6 and 6 or 2 times 6?
7. Hilery caught 7 partridges in one net and 7 in another. How many did he catch in both? How many are 7 and 7 or 2 times 7?
8. If you buy 9 apples at the store and your sister give you 9 more, how many apples will you then have?
9. Joshua bought 12 toys at a shop and his father gave him 12 more. How many toys did he then have? How many are 12 and 12 or 2 times 12?

### Recite Table:

2 times 1 are 2,	2 times 7 are 14,
2 times 2 are 4,	2 times 8 are 16,
2 times 3 are 6,	2 times 9 are 18,
2 times 4 are 8,	2 times 10 are 20,
2 times 5 are 10,	2 times 11 are 22,
2 times 6 are 12,	2 times 12 are 24.

## Section II.

1. George caught 1 fish the first day he went a fishing 1 the second day, and 1 the third. How many fishes did he catch during the three days? How many are 1 and 1 and 1, or 3 times 1?
2. Amanda hemmed 2 handkerchiefs, Neal 2 and Rox 2. How many handkerchiefs did they all hem? How many are 2 and 2 and 2, or 3 times 2?
3. If a candle-stand have 3 legs, how many legs have 3 stands? How many are 3 and 3 and 3, or 3 times 3?
4. A chair has 4 legs. How many legs have 3 chairs? How many are 4 and 4 and 4, or 3 times 4?
5. On Monday James read 5 pages, on Tuesday 5 and on Wednesday 5. How many pages did he read during the three days? How many are 5 and 5 and 5, or 3 times 5?
6. A drover purchased 6 hogs from A, 6 from B. and 6 from C. How many did he purchase from the three? How many are 6 and 6 and 6, or 3 times 6?
7. A woman took some eggs to market and sold 8 of them to one merchant, 8 to another, and 8 more to a third. How many eggs did she sell? How many are 8 and 8 and 8, or 3 times 8?
8. A hen hatched at one time 11 speckled chicks, at another time 11 brown ones, and 11 black ones at another. How many chicks did she hatch in all? How many are 11 and 11 and 11, or 3 times 11?

## Recite Table 2.

3 times 1 are 3,	3 times 7 are 21,
3 times 2 are 6,	3 times 8 are 24,
3 times 3 are 9,	3 times 9 are 27,
3 times 4 are 12,	3 times 10 are 30,
3 times 5 are 15,	3 times 11 are 33,
3 times 6 are 18,	3 times 12 are 36.

## Section III.

1. 4 baskets have each 1 apple in it. How many apples are there in the 4 baskets? 4 times 1 are how many?

2. In a garden there are 4 rows of peach trees and 2 trees in a row. How many trees in the garden? 4 times 2 are how many?
3. There are 4 rows of plum trees in a garden and 3 trees in a row. How many trees in the garden? How many are 4 times 3?
4. In a field there are 4 rows of apple trees and 4 trees in a row. How many apple trees in the field? 4 times 4 are how many?
5. If you should read 4 pages every day, how many pages would you read in 5 days? 4 times 5 are how many? Count to 20 by fives, thus: 5 and 5 are 10, and 5 are 15, &c.
6. How many demerits will Rachel get in 4 days if she receive 6 demerits each day? 4 times 6 are how many? Count to 24 by sixes, thus: 6 and 6 are 12, &c.
7. If a man ride 4 miles in one hour how far can he ride in 7 hours? 4 times 7 are how many?
8. A market man sold 4 melons at 8 cents for one. How many cents did he get for all? 4 times 8 are how many?

Recite Table 3.

4 times 1 are 4,	4 times 7 are 28,
4 times 2 are 8,	4 times 8 are 32,
4 times 3 are 12,	4 times 9 are 36,
4 times 4 are 16,	4 times 10 are 40,
4 times 5 are 20,	4 times 11 are 44,
4 times 6 are 24,	4 times 12 are 48.

Section IV.

1. If one ream of letter paper cost 2 dollars, what will 5 reams cost? 5 times 2 are how many? Count to 10 by twos, thus: 2 and 2 are 4, &c.

2. If one barrel of flour cost 3 dollars, what will 5 barrels cost? 5 times 3 are how many? Can you count 15 by threes?
3. Harriet found 5 geese nests and in each nest there were 4 eggs. How many eggs in the 4 nests? 5 times 4 are how many? Can you count to 20 by fours?
4. Delphina received 5 merit marks every day for 5 days. How many did she receive in all? 5 times 5 are how many?
5. William had 5 sisters and each one of them gave him 6 apples on christmas day. How many apples did William then have? 5 times 6 are how many?
6. If 5 men go out a bird hunting and each one should kill 7 birds, how many would they all kill? 5 times 7 are how many? Can you count to 35 by sevens?
7. If 8 boys can sit upon one bench, what number of boys can sit upon 5 benches? 5 times 8 are how many? Count to 40 by eights, thus: 8 and 8 are 16, and 8 are 24, &c.

Recite Table 4.

5 times 1 are 5,	5 times 7 are 35,
5 times 2 are 10,	5 times 8 are 40,
5 times 3 are 15,	5 times 9 are 45,
5 times 4 are 20,	5 times 10 are 50,
5 times 5 are 25,	5 times 11 are 55,
5 times 6 are 30,	5 times 12 are 60.

#### Section V.

1. If you have 6 picture books and in each book there are 2 pictures, how many pictures are there in all? 6 times 2 are how many?



2. If one boy eat 3 pears, how many pears will 6 boys eat? 6 times 3 are how many?
3. If one box hold 4 bottles, how many bottles will 6 boxes hold? 6 times 4 are how many?
4. If 5 persons can ride in one wagon, how many persons can ride in 6 wagons? 6 times 5 are how many?
5. If 6 men can eat at one table, how many cat eat at 6 tables? 6 times 6 are how many?
6. If 7 hogs are in one pen, how many would there be in 6 pens? 6 times 7 are how many?
7. If one boy answer 8 questions in one day, how many questions would be answer in 6 days? 6 times 8 are how many? Count to 48 by eights?
8. if a horse eat 9 ears of corn at a feed, how many ears would 6 horses eat? 6 times 9 are how many? Add the number nine successively to itself to 54.

Recite Table 5.

6 times 1 are 6,  
6 times 2 are 12,  
6 times 3 are 18,  
6 times 4 are 24,  
6 times 5 are 30,  
6 times 6 are 36,

6 times 7 are 42,  
6 times 8 are 48,  
6 times 9 are 54,  
6 times 10 are 60,  
6 times 11 are 66,  
6 times 12 are 72.

1. If 7 girls, who have 2 beads apiece should put their beads together, how many would there be? 7 times 2 are how many?
2. 7 men have each 3 dollars apiece; how many dollars have they all? 7 times 3 are how many? Count to 21 by threes.

3. One chair has 4 legs; how many legs has 7 chairs? 7 times 4 are how many?
4. If you read 5 pages in one hour, how many pages can you read in 7 hours? 5 times 7 are how many?
5. If a man can earn 6 dollars in one week, how many dollars can he earn in 7 weeks? 7 times 6 are how many?
6. If a man can earn 7 dollars in one month, how many dollars can he earn in 7 months? 7 times 7 are how many?
7. If a fisherman catch 8 fishes each day for 7 days, how many fishes will he have? 7 times 8 are how many?

Recite Table 6.

7 times 1 are 7,	7 times 7 are 49,
7 times 2 are 14,	7 times 8 are 56,
7 times 3 are 21,	7 times 9 are 63,
7 times 4 are 28,	7 times 10 are 70,
7 times 5 are 35,	7 times 11 are 77,
7 times 6 are 42,	7 times 12 are 84.

Section VII.

1. If a lead pencil cost 2 cents, what will 8 cost? 8 times 2 are how many?
2. If one ream of paper cost 3 dollars, what will 8 reams cost? 8 times 3 are how many?
3. Charles spent 4 dollars every time he went to the store; how many dollars did he spend in going 8 times? 8 times 4 are how many?
4. James solved five examples each day: how many examples did he solve in 8 days? 8 times 5 are how many?
5. If one vest have 6 buttons on it, how many buttons would 8 vests have? 8 times 6 are how many?
6. If one apple tree have 7 bushels of apples on it, how many bushels ought 8 trees to have? 8 times 7 are how many?

7. If one watch cost 8 dollars, how many dollars would 8 watches cost? 8 times 8 are how much? Count to 64 by eights.

Recite Table 7.

8 times 1 are 8,  
8 times 2 are 16,  
8 times 3 are 24,  
8 times 4 are 32,  
8 times 5 are 40,  
8 times 6 are 48,

8 times 7 are 56,  
8 times 8 are 64,  
8 times 9 are 72,  
8 times 10 are 80,  
8 times 11 are 88,  
8 times 12 are 96.

Section VIII.

1. If I write 2 pages in one hour, how many pages will I write in 9 hours? 9 times 2 are how many?
2. If you make 3 dollars a day for nine days, how many dollars will you have? 9 times 3 are how many?
3. How many legs have 9 chairs, if one chair have 4 legs? 9 times 4 are how many?
4. 5 horses draw one wagon; how many horses are required to draw 9 wagons? 9 times 5 are how many?
5. If one man eat 6 peaches, how many peaches will 9 men eat? 9 times 6 are how many?
6. If a teacher make 7 pens in one minute, how many pens can 9 teachers make in the same time? 9 times 7 are how many?
7. A Confederate soldier captured 8 Yankees each day for 9 successive days; how many did he capture in all? 9 times 8 are how many? Count to 72 by eights.

Recite Table 8.

9 times 1 are 9,	9 times 7 are 63,
9 times 2 are 18,	9 times 8 are 72,
9 times 3 are 27,	9 times 9 are 81,
9 times 4 are 36,	9 times 10 are 90,
9 times 5 are 45,	9 times 11 are 99,
9 times 6 are 54,	9 times 12 are 108.

Section IX.

1. If 2 boys can sit at one desk, how many boys can sit at 12 desks? 12 times 2 are how many? Count to 24 by twos.
2. If one bushel of rye is worth 3 dollars how many dollars are 12 bushels worth? 12 times 4 are how many? Count to 36 by threes.
3. One horse has 4 legs; how many legs have 12 horses? 12 times 4 are how many? Count to 48 by fours?
4. Addison reads 5 pages of history a day; how many pages will he read in 12 days? 12 times 5 are how many? Count to 60 by fives.
5. Rachel answered 6 questions each day for 12 days, how many questions did she answer? 12 times 6 are how many? Count to 72 by sixes.
6. If one gallon of molasses cost 7 dollars, what will 12 gallons cost? 12 times 7 are how many? Count to 74 by sevens?
7. If one hat cost 8 dollars, what will 12 hats cost? 12 times 8 are how many? Count to 96 by eights.

Recite Table 3.

12 times 1 are 12,	12 times 7 are 84,
12 times 2 are 24,	12 times 8 are 96,
12 times 3 are 36,	12 times 9 are 108,
12 times 4 are 48,	12 times 10 are 120,
12 times 5 are 60,	12 times 12 are 144.
12 times 6 are 72,	

### Multiplication Table.

One	1	2	3	4	5	6	7	8	9	10	11	12
2 times	are 2	4	6	8	10	12	14	16	18	20	22	24
3 times	are 3	6	9	12	15	18	21	24	27	30	33	36
4 times	are 4	8	12	16	20	24	28	32	36	40	44	48
5 times	are 5	10	15	20	25	30	35	40	45	50	55	60
6 times	are 6	12	18	24	30	36	42	48	54	60	66	72
7 times	are 7	14	21	28	35	42	49	56	63	70	77	84
8 times	are 8	16	24	32	40	48	56	64	72	80	88	96
9 times	are 9	18	27	36	45	54	63	72	81	90	99	108
10 times	are 10	20	30	40	50	60	70	80	90	100	110	120
11 times	are 11	22	33	44	55	66	77	88	99	110	121	132
12 times	are 12	24	36	48	60	72	84	96	108	120	132	144

Note.-The multiplication table is given above in full, can be easily understood, and should be once for all thoroughly learned.

### Section X.

1. At 10 cents a pound, what will 6 pounds of rice cost? 7 pounds? 8 pounds? 10 pounds?
2. What will be the cost of 8 barrels of cider at 4 dollars a barrel? at 5 dollars? at 6 dollars?
3. When corn is 7 dollars a bushel, what will 3 bushels amount to? 4 bushels? 5 bushels?
4. At 5 cents a yard what will 9 yards of tape cost? 10 yards? 11 yards? 12 yards?
5. If my income is 12 dollars a month, how many dollars will I receive in 2 months? 4 months? 6 months?
6. At 11 dollars a month what will 5 months board cost? What will 6 months board cost?
7. 4 quarts make 1 gallon; how many quarts in 5 gallons? 6 gallons? 7 gallons?
8. If 12 ounces make 1 pound, how many ounces will there be in 5 pounds? 6 pounds?
6. What will 12 pounds of pork cost at 12 cents a pound.

### Section XI.

1. If one pound of honey be worth 30 cents; how many cents are 2 pounds worth? 3 pounds? 4 pounds? Solution – 30 is the same as 3 tens; 2 times 3 tens are 6 tens, the same as 60. Ans. 60.
2. If a company of soldiers march 20 miles a day; how many miles will they march in 4 days? in 5 days? in 6 days?
3. How much would a farmer get for 6 mules, if he should sell them for 90 dollars apiece? Solution – 90 is the same as 9 tens, and 9 times 9 tens make 81 tens, the same as 810. Ans. 810 dollars.
4. 60 minutes make one hour; how many minutes are there in 7 hours? in 8 hours?
5. 20 penny-weights make one ounce. How many penny-weights are there in 9 ounces? in 10 ounces? in 11 ounces? in 12 ounces?
6. 20 shillings make one pound. How many shillings are there in 4 pounds? in 5 pounds? in 6 pounds?

7. If a trader make 40 cents on every pound of butter he sells, how much will he make on 8 pounds? on 9 pounds? on 10 pounds?
8. 10 cents make one dime. How many cents are there in 10 times? in 11 dimes? in 12 dimes?
9. If a silver watch sell for 10 dollars, what will 15 watches of the same kind sell for? 16 watches? 17 watches?
10. If one man earn 25 dollars in a day, how many dollars can 10 men earn in the same time? Ans. 250.
11. If one gallon of syrup cost 15 dollars, what will 10 gallons cost?
12. If on confederate soldier kill 90 yankees, how many yankees can 10 confederate soldiers kill?

Division.



Section I.

1. If you had 2 apples and were to eat 1 at a time, how many times could you eat 1 apple? How many times 1 in 2? 2 times 1 are how many?
2. How often can you borrow 2 dollars of a person who has only 2 dollars? How many times 2 in 2?
3. If you had 4 oranges and were to eat 2 oranges a day, how many days would you be in eating the 4 oranges? How many times 2 in 4? 2 times 2 are how many?
4. Joshua has 6 hickory nuts; to how many boys can he give 2 nuts apiece? How many time 2 in 6? How many are 2 times 3?
5. Peola purchased 8 crackers at a toy shop and then sold them all to a company of boys, selling 2 to each boy. How many boys were there in the company? How many times 2 in 8? 2 times 4 are how many?
6. Wesley bought 10 pears and laid them down on the floor 2 in a place; in how many places were they. How many times 2 in 10? How many are 2 times 5?

Recite Table 1.

2 in 2, 1 time,  
2 in 4, 2 times,  
2 in 6, 3 times,  
2 in 8, 4 times,  
2 in 10, 5 times,  
2 in 12, 12 times,

2 in 14, 7 times,  
2 in 16, 8 times,  
2 in 18, 9 times,  
2 in 20, 10 times,  
2 in 22, 11 times,  
2 in 24, 12 times.



## Section II.

1. If a pencil cost 3 cents, how many pencils can you buy for 6 cents? How many times 3 in 6? How many are 2 times 3?
2. A merchant has 9 dollars to give for hats. How many hats can he buy if one hat cost 3 dollars? How many times 3 in 9? How many are 3 times 3?
3. How many times must you go after 12 melons if you can only bring 3 at a time? How many times 3 in 12? How many are 3 times 4?
4. If I use 3 goose quills a day, how many days will 15 last me? How many times 3 in 15? How many are 3 times 5?
5. If one picture book cost 3 cents, how many can you buy with 18 cents? How many times 3 in 18? How many are 3 times 5?
6. If one melon cost 3 cents, how many can you buy with 21 cents? How many times 3 in 21? How many times 2 in 21? How many are 3 times 7?
7. Out of a basket containing 24 pears, how many times can you take out of 3 pears? How many times 3 in 24? How many are 3 times 8?

### Recite Table 2.

3 in 3, 1 time,  
3 in 6, 2 times,  
3 in 9, 3 times,  
3 in 12, 4 times,  
3 in 15, 5 times,  
3 in 18, 6 times,

3 in 21, 7 times,  
3 in 24, 8 times,  
3 in 27, 9 times,  
3 in 30, 10 times,  
3 in 33, 11 times,  
3 in 36, 12 times.

### Section III.

1. Sylvester has 9 apricots and for every 4 of them he can get one dollar. How many dollars can he get for all his apricots? How many times 4 in 8? How many are 4 times 2?
2. If you learn 4 pages a day, how many days will you be in learning 12 pages? How many times 4 in 12? How many are 4 times 3?
3. A farmer has 16 hogs and wishes to kill 4 hogs each day until all are killed. How many days will it take? How many times 4 in 16? How many are 4 times 4?
4. If you answer 4 questions every recitation, how many recitations will it take you to answer 20 questions? How many times 4 in 20? How many are 4 times 5?
5. There are 4 boys in a class. How many classes in a school of 24 boys? How many times 4 in 24. How many are 4 times 6?
6. 28 men were sent out on picket duty, 4 in a company. How many companies were there? How many times 4 in 28? How many are 4 times 7?

### Recite Table 3.

4 in 4, 1 time,	4 in 28, 7 times,
4 in 8, 2 times,	4 in 32, 8 times,
4 in 12, 3 times,	4 in 36, 9 times,
4 in 16, 4 times,	4 in 40, 10 times,
4 in 20, 5 times,	4 in 44, 11 times,
4 in 24, 6 times,	4 in 48, 12 times.

### Section IV.

1. How many pounds of soda will 10 dollars buy, if one pound cost 5 dollars? How many times 5 in 10? How many are 5 times 2?

2. If one knife cost 5 dollars, how many knives will 15 dollars buy? How many times 5 in 15? How many are 5 times 3?
3. If 5 horses can draw one wagon, how many wagons could 20 horses draw? How many times 5 in 20? How many are 5 times 4?
4. If 5 cents will pay for one orange, how many oranges can you buy for 25 cents? How many times 5 in 35? How many are 5 times 5?
5. If you earn 5 dollars a day, how many days will it take you to earn 30 dollars? How many times 5 in 30? How many are 5 times 6?
6. A man had 35 hogs in 5 different pens. How many hogs were there in a pen? How many times 5 in 35? How many are 5 times 7?
7. 40 men took breakfast, 5 eating at one table. How many tables were there? How many times 5 in 40? How many are 5 times 8?

Recite Table 4.

5 in 5, 1 time,	5 in 35, 7 times,
5 in 10, 2 times,	5 in 40, 8 times,
5 in 15, 3 times,	5 in 45, 9 times,
5 in 20, 4 times,	5 in 50, 10 times,
5 in 25, 5 times,	5 in 55, 11 times,
5 in 30, 6 times,	5 in 60, 12 times.

Section V.

1. If you have 12 cents, to how many persons can you give 6 cents? How many times 6 in 12? How many are 6 times 2?

2. If one quire of paper cost 6 dollars, how many quires can I purchase with 18 dollars? How many times 8 in 18? How many are 6 times 3?
3. If 6 pen-knives cost 24 dollars, what will be the cost of one pen knife? How many times 6 in 24? How many are 6 times 4?
4. A market woman had 30 oranges; to how many persons could she sell 6 oranges? How many times 6 in 30? How many are 6 times 5?
5. If 36 soldiers should be separated into squads of 6 men each, how many squads would there be? How many times 6 in 36? How many are 6 times 6?
6. If one ink-stand be worth 6 cents, how many ink-stands can be bought for 42 cents? How many times 6 in 42? How many are 6 times 7?
7. If 6 men contribute 48 dollars towards building a church, how many dollars would that be for one man? How many times 6 in 48? How many are 6 times 8?

Recite Table 5.

6 in 6, 1 time,  
6 in 12, 2 times,  
6 in 18, 3 times,  
6 in 24, 4 times,  
6 in 30, 5 times,  
6 in 36, 6 times,

6 in 42, 7 times,  
6 in 48, 8 times,  
6 in 54, 9 times,  
6 in 60, 10 times,  
6 in 66, 11 times,  
6 in 72, 12 times.

Section VI.

1. There are 7 days in a week; how many weeks are there in 14 days? How many times 7 in 14? How many are 7 times 2?

2. If 21 dollars are divided among 7 families, how many dollars will one family receive? How many times 7 in 21? How many are 7 times 3?
3. How many yards of cloth worth 7 dollars a yard, can be bought for 28 dollars? How many times 7 in 28? How many are 7 times 4?
4. If a man dig a trench 7 feet long in an hour, how long will it take him to dig a trench 35 feet long? How many times 7 in 35? How many are 7 times 5?
5. If one man can do a piece of work in 42 days, how many days will it take for 7 men to do the same work? How many time 7 in 42? How many are 7 times 6?
6. If one Confederate soldier can whip 7 Yankees, how many soldiers can whip 49 Yankees? How many times 7 in 49? How many are 7 times 7?
7. If 7 bushels of potatoes cost 56 dollars, how many dollars will one bushel cost? how many times 7 in 56? How many are 7 times 8?
8. When wheat is worth 7 dollars a bushel, how many bushels can you buy for 63 dollars? How many times 7 in 63? How many are 7 times 9?

Recite Table 6.

7 in 7, 1 time,  
7 in 14, 2 times,  
7 in 21, 3 times,  
7 in 28, 4 times,  
7 in 35, 5 times,  
7 in 42, 6 times,

7 in 49, 7 times,  
7 in 56, 8 times,  
7 in 63, 9 times,  
7 in 70, 10 times,  
7 in 77, 11 times,  
7 in 84, 12 times.

## Section VII.

1. If one pound of sugar cost 8 cents, how many pounds can you buy for 16 cents? How many times 8 in 16? How many are 8 times 2?
2. If a Dixie primer cost 8 cents, how many primers can you buy for 24 cents?
3. If you turn 8 pages a week in your new reader, how many weeks will it require for you to read 32 pages? How many 8 in 32? How many are 8 times 4?
4. If one pound of raisins cost 8 cents, how many pounds will 40 cents buy? How many times 8 in 40? How many are 8 times 5?
5. If 48 dollars will purchase 8 pocket knives, what will one knife cost? How many times 8 in 48? How many are 8 times 6?
6. If one book cost 8 cents, how many books can you buy with 56 cents? How many times 8 in 56? How many are 8 times 7?
7. If 8 men in trading gain 64 dollars, what part of the gain is one man's share? How many 8 in 64? How many are 8 times 8?
8. If 8 men form a company, how many companies can be formed out of 72 men? How many times 8 in 72? How many are 8 times 9?
9. How many squads of 8 men each can you form out of a company of 80 men? How many times 8 in 80? How many are 9 times 10?

Recite Table 7.

8 in 8, 1 time,  
8 in 16, 2 times,  
8 in 24, 3 times,  
8 in 32, 4 times,  
8 in 40, 5 times,  
8 in 48, 6 times,

8 in 36, 7 times,  
8 in 64, 8 times,  
8 in 72, 9 times,  
8 in 80, 10 times,  
8 in 88, 11 times,  
8 in 96, 12 times.

Section VIII.

1. If 18 men perform a piece of work in one day, in how many days will 9 men do the same work? How many times 9 in 18? How many are 9 times 2?
2. If one steel pen is worth 9 cents, how many pens can you buy for 27 cents? How many times 9 in 27? How many are 9 times 3?
3. If one bushel of corn sell for 9 dollars, how many bushels can the man purchase who had 36 dollars? How many times 9 in 36? How many are 9 times 4?
4. If you divide 45 dollars equally among 9 men, how many dollars will be one man's share? How many times 9 in 45? How many are 9 times 5?
5. In an orchard there are 54 trees, 9 in a row. How many rows are there in the orchard? How many times 9 in 54? How many are 9 times 6?
6. If 9 yards of cloth clothe a man, how many men can be clothed out of 63 yards?
7. If you walk 72 miles in 9 days, how many miles must you walk each day? How many times 9 in 72? How many are 9 times 8?
8. If 81 soldiers are divided into 9 equal divisions, how many soldiers will there be in each?

How many times 9 in 81? How many are 8 times 9?

9. If one book cost 9 cents, how many books can you buy for 90 cents? How many times 9 in 90? How many are 9 times 10?

Recite Table 8.

9 in 9, 1 time,  
9 in 18, 2 times,  
9 in 27, 3 times,  
9 in 36, 4 times,  
9 in 45, 5 times,  
9 in 54, 6 times,

9 in 63, 7 times,  
9 in 72, 8 times,  
9 in 81, 9 times,  
9 in 90, 10 times,  
9 in 99, 11 times,  
9 in 108, 12 times.

Section IX.

1. If with 20 dollars you can buy 10 hats what will one hat cost? How many times 10 in 20? How many are 10 times 2?

2. If a ploughshare cost 10 dollars, how many ploughshares can you buy for 30 dollars? How many times 10 in 30? How many are 10 times 3?

3. If one bushel of wheat is worth 10 dollars, how many bushels can you purchase for 30 dollars?

4. At 10 dollars a pound, how many pounds of coffee can you purchase for 40 dollars?

5. If a man travel 10 miles a day how many days will he be in performing a journey of 100 miles?

Recite Table 9.

10 in 10, 1 time,  
10 in 20, 2 times,  
10 in 30, 3 times,  
10 in 40, 4 times,  
10 in 50, 5 times,  
10 in 60, 6 times,

10 in 70, 7 times,  
10 in 80, 8 times,  
10 in 90, 9 times,  
10 in 100, 10 times,  
10 in 110, 11 times,  
10 in 120, 12 times.



Section X.

1. If 11 quires of paper cost 22 dollars, what is the cost of one quire? How many times 11 in 22? How many are 11 times 2?
2. A farmer got 33 dollars for some hogs that he sold at 11 dollars apiece; how many hogs were there? How many times 11 in 33? How many are 11 times 3?
3. How many scythe blades will 44 dollars buy at 11 dollars a piece? How many times 11 in 44? How many are 11 times 4?
4. If 11 axes cost 55 dollars, what will one axe cost? How many times 11 in 55? How many are 11 times 5?
5. With 66 dollars, how many yards of calico can you buy if each yard cost 11 dollars? How many times 11 in 66? How many are 11 times 6?
6. At 11 cents for one steel pen, how many pens can you purchase for 77 dollars? How many times 11 in 77? How many are 11 times 7?

Recite Table 10.

11 in 11, 1 time,	11 in 77, 7 times,
11 in 22, 2 times,	11 in 88, 8 times,
11 in 33, 3 times,	11 in 99, 9 times,
11 in 44, 4 times,	11 in 110, 10 times,
11 in 55, 5 times,	11 in 121, 11 times,
11 in 66, 6 times,	11 in 132, 12 times.

Section XI.

1. The number 12 is called a dozen; how many dozens are there in 24? How many times 12 in 24? How many are 12 times 2?

2. 12 ounces make 1 pound; how many ounces are there in 36 pounds? How many times 12 in 36? How many are 12 times 3?
3. How many days will it be before 48 men are on duty if 12 men should be called out each day? How many times 12 in 48? How many are 12 times 4?
4. If 60 pounds of beef be divided equally among 12 men, how many pounds will each man have? How many times 12 in 60? How many are 12 times 5?
5. A gentlemen performed a journey in 12 days at an expense of 72 dollars; what was the expense of each day? How many times 12 in 72? How many are 12 times 6?
6. How many days will it take 12 men to do a piece of work that 84 men would do in one day? How many times 12 in 84? How many are 12 times 7?
7. If one pair of cards is worth 12 dollars, how many pairs can you buy for 96 dollars? How many times 12 in 96? How many are 12 times 8?
8. If an arithmetic is worth 12 dollars, how many arithmetic can you purchase for 108 dollars? How many times 12 in 108? How many are 12 times 9?

Recite Table 11.

12 in 12, 1 time,  
12 in 24, 2 times,  
12 in 36, 3 times,  
12 in 48, 4 times,  
12 in 60, 5 times,  
12 in 72, 6 times,

12 in 84, 7 times,  
12 in 96, 8 times,  
12 in 108, 9 times,  
12 in 120, 10 times,  
12 in 132, 11 times,  
12 in 144, 12 times.

## Section XII.

1. How many oranges can be bought for 5 cents, at 11 cents each? Solution. – Since 11 cents will buy 1 orange, 55 cents will buy as many oranges as 11 times is contained in 55. 11 in 55, 5 times. Answer. 5 oranges.
2. A farmer paid 96 dollars for hogs at 12 dollars a piece; how many hogs did he buy?
3. A 9 dollars a bushel, how many bushels of corn can be bought for 54 dollars?
4. Bought 7 bushels of peas for 63 dollars; what was the price of one bushel?
5. If a man can build 8 rods of wall in one day, how many days will it take him to build 72 rods of wall?
6. If a man can build 8 rods of wall in one day, how many days will it take him to build 72 rods of wall?
7. How many barrels of flour can be made out of 45 bushels of wheat, if 5 bushels will make one barrel?
8. If 6 apples are worth one orange, how many oranges are 60 apples worth?
9. In an orchard there are 77 trees, there being 11 trees in a row; how many rows are there?
10. If 10 girls, by sewing, make 100 dollars, how many dollars will be each girl's share?
11. If one bushel of potatoes cost 4 dollars, how many bushels can you purchase with 48 dollars?
12. If one silk bonnet be worth 12 dollars, how many silk bonnets can you purchase for 148 dollars?
13. If one keg hold 7 gallons, how many kegs will hold 84 gallons?
14. How many hats can you buy with 108 dollars, if one hat cost 12 dollars?
15. If one soldier has provision for 56 days, how long would the same provision last 8 men? Answer. 7 days.

### Miscellaneous Examples.

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1. If 3 sheep cost 18 dollars, how many dollars will one sheep cost?
2. If one knife cost 20 cents, what will 4 knives cost at the same rate?
3. Mary bought two books, paying 20 cents for one and 4 cents for the other. What did both cost?
4. A farmer bought 9 horses and afterwards sold three of them; how many horses had he left?
5. Virgil paid 8 dollars for one hat; what will 4 hats cost at the same rate?
6. Joseph walked 20 miles in one day; how many miles did he walk in 2 days?
7. If 4 mules are required to draw one wagon, how many wagons can 20 mules draw?
8. Spencer caught 10 fishes, Alfred 5 and James 2; how many fishes did they all catch?
9. John Quincy caught 30 partridges and in conveying them home 10 of them escaped; how many had he still?
10. 3 little boys gathered 60 chestnuts and divided them equally between them; how many chestnuts did each boy have?
11. A gentlemen paid 7 dollars for a bridle and 9 dollars for a saddle; how many dollars did he pay for both?
12. A lady paid 24 dollars for 8 yards of calico; what was the price of one yard?
13. A fowler caught 13 birds but let 6 get away; how many birds had he left?
14. 7 Confederate soldiers captured 21 Yankees and divided them equally between them; how many did each one have?
15. What will 8 dozens of eggs cost at 5 cents a dozen?
16. 17 men were out on picket duty when 9 of them were recalled; how many remained on duty?

17. Out of a company of 100 men, how many companies of 10 men each can be formed?
18. If you read 15 pages in 1 day, how many pages can you read in 3 days?
19. George worked 3 examples, John 4 and Thomas 5; how many examples did they all work?
20. William hoed 5 rows, Willis 6, and Peola 7, how many rose did all three hoe?
21. A merchant bought 6 kegs of tobacco of one man and 8 of another, and then sold 3 kegs; how many kegs had the merchant then?
22. How many days will it take 9 men to perform the work that 1 man would perform in 27 days?
23. If you buy 12 yards of cloth at 8 dollars a yard, how many yards of cloth will it pay for at 3 dollars a yard?
24. A man paid 12 dollars for a hat, 9 dollars for a vest, 8 dollars for a pair of shoes, and then had 7 dollars remaining; how many dollars had he at first?
25. What sum of money must be divided among 12 men in order that one man shall receive 11 dollars?
26. 4 men gave to the church 60 dollars; the first man gave 12 dollars, the second 10, and the third 8; how many dollars did the fourth man give?
27. If you spend 5 dollars as often as your brother spends 10, how many dollars will you spend while your brother spends 100?
28. A travels 9 miles as often as B travels 8; how many miles will A travel while B is travelling 64 miles? Ans. 72 miles.
29. What sum of money must be divided among 9 men in order that 1 man shall receive 10 dollars?
30. John has found 20 cents, and has lost 15 cents; he now has 10 cents. How much had he at first?
31. A lady spent at the store 8 dollars for gloves, 7 dollars for shoes, 4 dollars for cambric, and then had 10 dollars remaining. How many dollars had she at first?
32. A farmer went to town with 10 barrels of flour, which he sold at 6 dollars a barrel. He then purchased 8 bushels of salt at 5 dollars a bushel. How many dollars had he to take home?

33. How many quires of paper, at 7 dollars a quire, can the student, who has 52 dollars, purchase, and how many dollars will he have remaining?
34. If I pay 4 dollars apiece for 5 hats, and 6 dollars apiece for 7 shoes, for how many dollars must I sell the whole, in order to gain 2 dollars?
35. Two men made up a purse of money. The first man put in 10 dollars, and the second 3 times as much as the first. How many dollars did both contribute?
36. A trader gave 100 dollars for 10 barrels of flour, and then sold it for 9 dollars a barrel. What did he lose?
37. A man and a boy were shelling corn; the man shelled 10 ears as often as the boy shelled 5; how many will the man shell while the boy is shelling 30 ears?

## Fractions.



### Section 1.

If you divide an apple into 2 equal parts, one of these parts is called *one-half*.

1. If you divide a melon into 2 equal parts, what do you call one part? What do you call the other part?
2. How many halves make the whole melon, or the whole of anything?
3. If 1 half an orange cost 1 cent, what will the whole orange, or 2 halves cost?
4. If 1 apple cost 3 cents, what will 2 apples cost. What part of 2 apples is s1 apple?
5. Joshua had 10 cents and gave 1 half of it to his brother? how many cents did he give him? How many cents had he left?
6. If I give away 1 half of my money and have 10 cents left, how much money had I at first? What part of 20 is 10?
7. If 1 half a pound of beef is worth 4 cents, what is the whole pound worth?
8. If a whole cheese cost 6 dollars, what will 1-half a cheese cost?
9. If 4 is 1-half of some number, what is the number?
10. If there are are 2 halves in one whole pear, how many halves are there in 2 pears? How many halves in 3 pears? in 4 pears? in 5 pears? in 6 pears?
11. If 2 halves make the whole of anything, how many whole numbers are there in 4 halves? How many in 6-halves? in 8-halves? in 10-halves?
12. In 3-halves how many whole ones, and how many halves remaining? Solution. – 2 halves make 1 whole one, therefore in 3 halves there is 1 whole one, and 1 half.

13. In 5-halves how many whole ones, and what remaining? Solution. – 2-halves make 1 whole one. There are therefore as many whole ones in 5-halves as 2 is contained times in 5; 2 in 5, 2 times with 1-half remaining. Ans. 2 and 1-half.
14. In 7 halves how many whole ones, and what remaining? Ans. 3 and 1-half.
15. In 9-halves how many whole ones and what remaining? In 11-halves? in 13-halves?

## Section II.

If an apple or any thing is divided into 3 equal parts, one of these parts is called 1-third, 2 parts 2-thirds and 3 parts 3-thirds or one whole one.

1. If you had 1-third of a dollar and were to find 1-third more, what part of a dollar would you then have?
2. If you pay out 1-third of the money you have for an Arithmetic and 2-thirds for a watch, how many thirds have you paid out? How many whole ones in 3-thirds?
3. How many thirds are 2-thirds and 3-thirds? 2-thirds and 4-thirds and 5-thirds?
4. How many thirds are 6-thirds and 4-thirds? 10-thirds and 5-thirds? 8-thirds and 6-thirds?
5. If you own 2-thirds of a farm and sell 1-third, what part of the farm do you still own?
6. If I own a mill (3-thirds) and sell 1-third, what part of the mill do I still own? If I sell 2-thirds what part of the mill will I then own?
7. From 5 thirds take 2-thirds. From 6-thirds take 3-thirds: From 8-thirds take 5-thirds. From 10-thirds take 7-thirds?
8. If a pencil be worth 1-third of a dollar, how many thirds will 2 pencils be worth?  
Solution. – If one pencil be worth 1-third, 2 pencils will be worth 2 times as much as 1 pencil. 2 times 1-third is 2-thirds. Ans. 2-thirds.



9. If 1-third of a pound of soda be worth 1 dollar, how many thirds can you buy for 6 dollars?
10. If 1-third of a pound of butter be worth 5 cents what is 2-thirds worth?
11. If 1-third of a bushel of wheat sell for 2 dollars, what would the whole bushel sell for?
12. If 1-third of a quart of rice, be worth 6 cents, what is 2-thirds worth? What is 3-thirds worth? 4-thirds? 5-thirds? 6-thirds?
13. If 3 knives be worth 12 dollars, what is 1 knife worth? What part of 3 is 1?  
Solution. – If 3 knives be worth 12, 1 knife is worth 1-third of 12 or 4. Ans. 4 dollars.
14. If 3 bushels of corn be worth 18 dollars, what is the price of 1 bushel?
15. 4 is 1-third of some number; what is the number? Solution. – If 4 is 1-third, the whole number or 3-thirds is 3 times 4. Ans. 12.
16. 6 is 1-third of what number? 8 is 1-third of what number? 12 is 1-third of what number? 12 is 1-third of what number?
17. If three men earn 6 dollars in 1 day, how many dollars can 4 men earn in the same time? Solution. – If 3 men earn 6 dollars, 1 man will earn 1-third of 6 or 2 dollars, and 4 men will earn in the same time, 4 times what one man earns. 4 times 2 are 8. Ans. 8 dollars.
18. If 3 men can cultivate 12 acres of land, how many acres can 5 men cultivate?
19. How many whole ones in 3-thirds?
20. If 3-thirds make 1 whole one, how many whole ones are there in 6-thirds?  
Solution. – There are as many whole ones as 3-thirds is contained times in 6-thirds; 3 in 6, 2 times. Ans. 2.
21. In 9-thirds how many whole ones? in 12-thirds? in 15-thirds? in 18-thirds?
22. How many thirds in one whole one?
23. In 4-thirds how many whole ones and how many thirds over? Solution. – 3-thirds is contained in 4-thirds 1 and 1-third time.

24. In 5-thirds how many whole ones, and how many thirds remaining? Solution. – 3-thirds in 5-thirds, 1 time and 2 remaining. – Ans. 1 and 2-thirds.
25. In 6-thirds how many whole ones?
26. In 7-thirds how many whole ones, and how many thirds remaining? in 8-thirds?
27. In 9-thirds, how many whole ones?
28. In 10-thirds how many whole ones, and how many thirds remaining? in 11 thirds?
29. If a share in an iron foundry be worth 33 dollars, how much is 1-third of a share worth? What is 2-thirds worth?
30. If 3 stacks of hay be worth 37 dollars, what is 1 stack worth? Ans. – 12 and 1-third dollars.

### Section III.

If you divide any thing, as a melon, into 4 equal parts, 1 of these parts is called 1-fourth; 2 parts, 2-fourths; 3 parts, 3-fourths.

1. How many fourths are equal to a whole one?
2. James had 1-fourth of a stick of candy, and William gave him 1-fourth more, how many fourths did James then have?
3. If you give 1-fourth of your money for a slate, and 2-fourths for a book, how many fourths have you spent?
4. If you eat 2-fourths of a melon at one time and 2-fourths at another, how many fourths have you eaten?
5. How many are 2-fourths and 3-fourths? 5-fourths and 2-fourths? 6 fourths and 4-fourths? 9-fourths and 3-fourths?
6. If you have 2-fourths of an apple and give away 1-fourth, what part of an apple will you have left?
7. Which is the most, 1 whole one, or 4-fourths?
8. If you sell 3-fourths of a pencil, what part of a pencil will you have left?
9. From 4-fourths take 2-fourths? From 5-fourths take 3 fourths? From 9-fourths take 6-fourths?
10. John paid 1-fourth of all the money he had for a Dixie Reader and 2-fourths for an Arithmetic, how many fourths were left?

11. If 1-fourth of an orange be worth 8 cents, what are 3-fourths times as much as 1-fourth; 3 times 8 are 24. Ans. 24 cents.
12. If 1 fourth of a pound of coffee be worth 5 dollars, what are 3-fourths of a pound worth? What will 4-fourths or the whole pound sell for? 5-fourths? 6-fourths? 9-fourths?
13. If 4 pounds of tea be worth 8 dollars, what is 1 pound worth? What part of 4 is 1? What is 1 fourth of 8?
14. If 4 bushels of peas be worth 12 dollars, what is 1 bushel worth?
15. 3 is 1-fourth of what number? Solution. – If 3 is 1-fourth, 4-fourths are 4 times 3. Answer. 12.
16. 6 is 1-fourth of what number? 8 is 1-fourth of what number? 10 is 1-fourth of what number?
17. If 4 ounces of indigo be worth 8 dollars, what will 2 ounces be worth? Solution. – If 4 ounces be worth 8 dollars, 1 ounce is worth 1-fourth of 8, which is 2 dollars; if 1 ounce be worth 2 dollars, 2 ounces are worth 2 times 2 dollars. Ans. 4 dollars.
18. If 4 persons can lift 24 pounds, how many pounds can 5 persons lift?
19. How many whole ones in 4-fourths? in 8-fourths? in 12-fourths? in 16-fourths? in 20-fourths?
30. In 5-fourths how many fourths remaining? Solution. – 4-fourths in 4-fourths 1 time and 1 fourth remaining. Ans. 1 and 1 fourth.
21. In 6-fourths, how many whole ones, and what remaining? in 7-fourths? in 9-fourths? in 10-fourths in 11-fourths?
22. If 4 tons of hay will keep 8 horses through the winter, how many tons will keep 3 horses during the same time? Solution. – If 4 tons will keep 8 horses, 1 ton will keep 1-fourth of 8 horses or 2 horses; if 1 ton will keep 2 horses, 3 tons will keep 3 times 2, or 6 horses.

23. If 4 men can drink 12 gallons of beer in 1 day, how many gallons can 6 men drink in the same time?
24. If 4 barrels of superfine flour cost 33 dollars, what will 1 barrel cost. Ans. 8 and 1-fourth.
25. If four men consume 18 pounds of flour in one week, how many pounds will 1 man consume in the same time? Ans. 4 and 2-fourths.

#### Section IV.

If you divide any one thing into 5 equal parts, 1 of these parts is called 1-fifth, 2 parts 2-fifths, 3 parts 3-fifths, and so on to 5-fifths, or 1 whole one.

1. George paid 1-fifth of all the money he had for a comb, and 3-fifths for a knife, how many fifths did he pay out?
2. If you give 2-fifths of your money for chestnuts, and 3-fifths for chincapins, how many fifths have you spent?
3. How many fifths are 4-fifths and 3-fifths?
4. Suppose you purchase 2-fifths of a share in the Union Manufacturing Company, 3-fifths in the Cedar Falls Company, and 4-fifths in the Island Ford, how many fifths will you then own?
5. How many fifths are 4-fifths and 5-fifths? 6-fifths and 3-fifths? 6 fifths and 4-fifths?
6. If I own 1 yard of broad cloth, and sell 1-fifth of what I own, what part of a yard will I still own?
7. If a yard of ribbon be cut into 5 equal parts, and I sell 2-fifths, what will I have left?
8. From 5-fifths take 4-fifths; from 8 fifths take 6 fifths; from 7-fifths take 5 fifths.
9. If one yard of cambric cost 5 cents, what will 1 fifth of a yard cost?
10. Suppose paper is worth 25 cents a quire, what is 1-fifth of a quire worth?
11. If 1 fifth of a pound of leather be worth 2 dollars, what are 2 fifths of a pound worth?
12. If 1-fifth of a pound of cheese be worth 4 dollars, what will 3-fifths of a pound be worth?

13. If 1 fifth of a company of men, consists of 10 men, how many men are there in 4 fifths of a company?
14. If 1 fifth of a barrel of molasses be worth 3 dollars, what are 4 fifths of a barrel worth? What is 1 barrel worth?
15. If 1-fifth of a pound of sugar be worth 10 cents, what is 1 pound worth? Solution.  
– If 1 fifth be worth 10 cents, the whole pound or 5 fifths is worth 5 times the value of 1 fifth. Ans. 50 cents.
16. If 5 dollars in specie be worth 20 dollars in Confederate money, how much is 1 dollar in specie worth?
17. what part of 5 dollars is 1 dollar?

#### Section V.

If you divide anything into 6 equal parts, 1 of these parts is called 1-sixth, 2 parts 2 sixths, 3 parts 3-sixths, and so on.

1. If we divide anything into 7 equal parts, what do you call one of the parts? 2 of the parts? 3 of the parts, 4 of the parts? 5 of the parts?
2. If you divide the whole of anything into 8 equal parts, what do you call 1 of the parts? 2 of the parts? 3 of the parts? 7 of the parts?
3. If you divide any thing into 9 equal parts, what do you call 1 of the parts? 2 of the parts? 3 of the parts? 6 of the parts? 8 of the parts?
4. If any thing is divided into 10 equal parts, what is 1 part called? 2 parts? 3 parts? 8 parts? 9 parts?
5. How many sixths are there in the whole of any thing? how many sevenths? how many eighths? how many ninths? how many tenths?
6. If you buy 1 sixth of a quart of chesnuts from one man, 2-sixths of another, what part of a quart will you then have? What part of a quart will you want to make up the whole part?
7. Charles had 2-sevenths of a dollar, and James gave

him  $\frac{3}{7}$  more, what part of a dollar has Charles now? what part of a dollar will Charles want to make up 1 dollar?

8. If I have  $\frac{4}{8}$  of an acre of land, and my brother gives me  $\frac{3}{8}$  more, what part of an acre do I now have? What part must I buy to have 1 whole acre?

9. How many ninths are  $\frac{3}{9}$  and  $\frac{5}{9}$ ?  $\frac{6}{9}$  and  $\frac{4}{9}$ ?  $\frac{8}{9}$  and  $\frac{5}{9}$ ?

10. Suppose you own  $\frac{9}{10}$  of a farm, what part of the farm must you buy to have the whole farm?

11. If you have  $\frac{3}{9}$  of a dollar what part of a dollar must you get to make up a whole dollar?

12. From  $\frac{6}{6}$  take  $\frac{2}{6}$ ; from  $\frac{6}{7}$  take  $\frac{3}{7}$  f from  $\frac{5}{8}$  take  $\frac{4}{8}$ ? from  $\frac{9}{9}$  take  $\frac{8}{9}$ .

13. If 1 fowl be worth  $\frac{1}{10}$  of a dollar, what are 2 fowls worth? what are 3 fowls worth?

14. A man walked 1 mile in  $\frac{1}{6}$  of an hour; how far can he walk in  $\frac{2}{6}$ ? how far in  $\frac{4}{6}$ ? in  $\frac{6}{6}$ ?

15. If I write 1 page in  $\frac{1}{10}$  of an hour, how many pages can I write in  $\frac{2}{10}$ ? in  $\frac{8}{10}$ ? in  $\frac{10}{10}$ ?

16. If 9 pounds of butter be worth 18 dollars, what is 1 pound worth?

17. If 6 pounds of bacon sell for 12 dollars, what will 1 pound sell for? 2 pounds? 3 pounds?

18. 6 is  $\frac{1}{7}$  of what number. Solution. – If 6 is  $\frac{1}{7}$  of some number,  $\frac{7}{7}$  or the number, is 7 times 6. Ans. 42.

19. 5 is  $\frac{1}{8}$  of what number?  $\frac{1}{10}$  of what number?

20. 9 is  $\frac{1}{9}$  of what number? 4 is  $\frac{1}{9}$  of what number?

21. How many whole ones are there in  $\frac{6}{6}$ ? in  $\frac{12}{6}$ ? in  $\frac{18}{6}$ ? in  $\frac{24}{6}$ ? in  $\frac{48}{6}$ ?

22. How many whole ones in  $\frac{14}{7}$ ? in  $\frac{21}{7}$ ? in  $\frac{28}{7}$ ? in  $\frac{35}{7}$ ?

23. How many whole ones in 16-eighths? in 24-eighths's in 20-tenths? in 40-tenths? in 60-tenths? in 48-eighths? in 24-tweffths?
24. In 7-sixths how many whole ones, and what remaining? in 8-sixths? in 10-sixths? in 15-sixths?
25. In 9-eighths how many whole ones? and how many eighths remaining? in 10-ninths? in 15-ninths? in 21-ninths?
26. If 1-ninth of a pound of candy be worth 2 cents, what are 2-ninths worth? what are 6-ninths worth? what are 9-ninths or the whole pound worth?
27. Suppose 4 is the 1-eleventh of some number, what is the whole of the number?
28. If 1-twelfth of a pound of rice be worth 3 cents, what is a whole pound worth?
29. How many times 1-tenth of any number, will make the whole number?
30. If 1-ninth of a pound of bacon cost 11 cents, what will a pound cost?
31. How many times 10ninth of any number will make the whole number?
32. If 1-eighth of a ton of hay be worth 3 dollars what is the whole ton worth?
33. If a yard of ribbon cost 64 cents what will 1-eighth of a yard cost? What will 5-eighths cost?
34. What is 1-twelfth of 24? 4 twelfths of 24? Solution. – 1-twelfth of 24 are 2; 4-twelfths are 4 times 2.
35. If a bushel of oats cost 77 cents what does 1-seventh of a bushel cost? 5 sevenths of a bushel?
36. Thereare 100 cents in a dollar. What number of cents are there in 4 tenths of a dollar? Solution – fi 10-tenths are 100 cents, 1-tenth is 10 cents and 4-tenths are 4 times 10. Ans. 40 cents.
37. If a pound of coffee be worth 96 cents what is 1-twelfth of a pound worth? 8-twelfths?
18. If 8-ninths of a hogshead of molasses be worth 72 dollars, what is 1-ninth of the hogshead worth?
39. If 1-ninth of a hogshead of molasses be worth 9 dollars, what are 9 ninths or the whole hogshead worth?

40. If 5 twelfths of an acre of land be worth 55 dollars, what are the whole acre worth?
41. What are 9-twelfths of 144? Direction – First find what 1-twelfth of 144 is and then 9-twelfths.
42. If a wheat fan cost 108 dollars what will 1-twelfth of it cost? what will 8-twelfths cost?
43. 96 is 8-twelfths of what number?
44. If you had 12-tenths of 100 dollars, how many dollars would you have?



### Promiscuous Examples.

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1. Three boys went a fishing; Thomas caught 4 fishes, Rufus 6 and Arthur 7, how many fishes did they all catch?
2. James walked 10 miles and John walked 6 miles further than James. How far did John walk?
3. Cornelia had 30 beads and gave 10 of them to her little sister. How many beads did Cornelia have left?
4. A man who received 11 dollars a day for work paid 5 dollars a day for board. How many dollars did he save each day?
5. 18 men were sent out on picket duty. The enemy surprised and took 9 of them prisoners. How many of them escaped?
6. If 1 quire of foolscap paper cost 6 dollars, how many dollars will 5 quires cost?
7. How many men are there in 3 companies, if each company have 80 men in it?
8. What sum of money must be divided among 12 men, in order that 1 man shall receive 5 dollars?
9. How many caps that are worth 7 dollars apiece can a man who has 49 dollars, purchase?
10. If you should perform 54 examples in Arithmetic in 9 days, how many examples would you perform in 1 day?
11. How many barrels of apples at 8 dollars a barrel must be given in exchange for 4 bushels of peaches at 12 dollars a bushel?
12. If I give 8 cents for a comb, 10 cents for a knife, and 2 cents for a pencil, and then sell the comb for 12 cents, the knife for 9 and the pencil for 4, have I made or lost by the operation?
13. A man failed in trade and could pay only 6 dollars on every 12 that he owe; how many dollars would he pay the creditor to whom he owed 144 dollars?

14. If  $\frac{1}{4}$  of an acre of land will produce 10 bushels of corn, how many bushels will 1 acre produce?
15. If we divide the whole of anything into 8 equal parts, and take away 5 of those parts, how much of the thing is left?
16. How much cloth, at 10 dollars a yard, can I buy for 1 dollar?
17. If 5 apples should each be divided into thirds, how many thirds would there be?
18. If a laborer earn 8 dollars and  $\frac{1}{2}$ , working at  $\frac{1}{2}$  a dollar a day, how many days did he work?
19. How many fifths are there in 5 and  $\frac{2}{5}$ ths?
20. How many ninths are there in 4 and  $\frac{6}{9}$ ths?
21. If  $\frac{1}{4}$  of a yard of cloth cost 1 dollar, what will 6 yards and  $\frac{3}{4}$ ths cost?
22. If  $\frac{3}{8}$ ths of a gallon of cider leak out of a cask in 1 hour, how much will leak out in 8 hours?
23. If  $\frac{1}{12}$ th of a pound of coffee sell for 3 dollars what will 1 pound sell for?
24. If  $\frac{1}{2}$  a pound of butter be worth 5 dollars what is the worth of 4 pounds?
25. If 1 quire of note paper be worth  $\frac{6}{11}$ ths of a dollar, how many dollars are 10 quires worth?
26. If 3 and  $\frac{1}{2}$  bushels of apples will bring 1 dollar, how many bushels will it take to bring 4 dollars?
27. A tree is standing so that  $\frac{2}{12}$ th of it is in the mud,  $\frac{6}{12}$ ths of it is in the water, and 40 feet of it is above the water. What is the height of the tree?



## Practical Arithmetic.

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### Definitions.

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1. Arithmetic is the science of numbers and the art of calculation.
2. A Unit is one or anything regarded as one.
3. A Number is a unit or a collection of units.
4. A Rule is a method prescribed to assist the learner in performing an operation.
5. In order to commence the study of Arithmetic and pursue it with success we must learn; 1<sup>st</sup>. The Alphabet or characters used in Arithmetic; 2<sup>nd</sup>. To write these characters so as to express numbers; 3<sup>rd</sup>. To read the numbers thus written.
6. Writing or expressing numbers by characters is called Notation.
7. Reading numbers expressed by characters is called Numeration.
8. The two systems of notation in general use are the Roman and the Arabic.

### The Arabic Notation.

9. The Arabic Notation employs 10 characters called figures to express numbers.  
Thus,

*Figures.*

*Names and values.*

1	-	-	-	-	-	-	one,
2	-	-	-	-	-	-	two,
3	-	-	-	-	-	-	three,
4	-	-	-	-	-	-	four,
5	-	-	-	-	-	-	five.
6	-	-	-	-	-	-	six,
7	-	-	-	-	-	-	seven,
8	-	-	-	-	-	-	eight,
9	-	-	-	-	-	-	nine,
0	-	-	-	-	-	-	nought or cipher,

10. We have no single character to represent ten, but we express it by writing the unit 1 at the left of cipher 0, thus. In the same manner we express 2 tens, or twenty 20; 3 tens or thirty 30; 4 tens or forty 40; &c.

11. When a number is expressed by two figures the right hand figure is called units, and the left hand figure tens, thus,

tens	units
2	5

12. When a number is expressed by three figures, the right hand figure expresses units, the second figure tens and the third hundreds; thus, read two hundred and fifty-six:

hundred	tens	units
2	5	6

13. When a number is expressed by four figures the places commencing at the right are, units, tens, hundreds, thousands. To write five thousand one and hundred eighty-nine, we write 5 in the place of thousands, 1 in the place of hundreds, 8 in the place of tens, and 9 in the place of units; thus,

thousands	hundreds	tens	units
5	1	8	9

14. Next above thousands we have successively tens of thousands hundreds of thousands, &c., as seen in the following table.

Numeration Table.

units	hundreds of trillions	tens of trillions	trillions	hundreds of billions	tens of billions	billions	hundreds of millions	tens of millions	millions	hundreds of thousands	tens of thousands	thousands	hundreds	tens
	9	8	7	6	2	3	5	2	1	8	3	2	7	5
														2

To read the above begin with the left hand figure and proceed as follows:

nine hundred six hundred thirty	eighty	seven trillions	one trillion	three billions	five hundred eight hundred	thirty	two thousand	seven hundred	fifty	two	7	1	2	9
											5	8	3	8
											2	7	5	7
														6
														2

15. In reading large numbers, it is more convenient to point them off, into periods of three figures each, counting from the right hand or units' place. Nought, or cipher, 0, expresses nothing of itself, and is only used to occupy a place when there is none of the denomination belonging to that place to be expressed. In the number 100 there are no units, nor tens; therefore (cut off of page) cipher stands in the place of each. In the number 90 (cut from page) there are no tens; therefore a cipher stands in the tens place.

16. From the principles already presented to the young student can easily comprehend the following rules.

Rule for Notation.

- I. Beginning at the left had write the figures belonging to the highest period first.*
- II. Write the hundreds, tens and units of each successive period in their order, placing a ciphher wherever an order of units is omitted.*

Rule for Numeration.

- I. Separate the number into periods of three figures each, commencing at the right hand.*
- II. Beginning at the left hand, read each period seperately and give the name to each period, except the periods of units.*

17. Express the following numbers by figures:

1. Thirteen.
2. Twenty-four.
3. Sixty-nine.
4. Eighty-eight.
5. One hundred twenty.
6. Two hundred fifty-four.
7. Eight hundred nine.
8. Nine hundred ninety-nine
9. Seven thousand one hundred.
10. Twenty-six thousand twenty-six.
11. Nin hundred thousand ninety.
12. Two millions nine hundred thousands.
13. Five millions eighty-two.
14. Ten millions two hundred one.
15. Seven thousand twenty-one.
16. Five hundred thousand.

18. Point off, numerate, and read the following numbers:

- |         |              |
|---------|--------------|
| 1. 102. | 8. 110099.   |
| 2. 290. | 9. 27500077. |

- |            |                  |
|------------|------------------|
| 3. 309.    | 10. 369020907.   |
| 4. 1006.   | 11. 10500201022. |
| 5. 9060.   | 12. 9090999000.  |
| 6. 30926.  | 13. 33333349.    |
| 7. 300897. | 12. 100000009.   |

Questions on Definitions, Notation and Numeration.

- (1.) What is arithmetic?
- (2.) What is a unit?
- (3.) What is a number?
- (4.) What is a rule?
- (5.) What must we learn in arithmetic 1<sup>st</sup>? What 2<sup>nd</sup>? What 3<sup>rd</sup>?
- (6.) What is notation?
- (7.) What is numeration?
- (8.) What two systems of notation are in general use?
- (9.) What does the Arabic notation employ in order to express numbers?
- (10.) How do you express the number ten?
- (11.) When a number is expressed by two figures, what is the right hand figure called? What is the left hand figure called?
- (12.) When a number is expressed by three figures what is right hand figure called? What the second? What the third?
- (13.) Repeat the Numeration table?
- (14.) What is the use of nought or cipher?
- (15.) Repeat the rule for notation? Repeat the rule for numeration?

Addition.

—



19. *Like numbers* have the same kind of units. Thus, 18, 25 and 76 are like numbers; also 13 dollars, 2 dollars and 1 dollar are like.

20. *Unlike numbers* do not have the same kind of units. Thus, 5 dollars and 3 feet are unlike.

21. Addition consists in writing several numbers of the same kind into one sum.

22. *The amount or sum* is the result obtained by addition.

Case I.

23. When the amount of any one column is less than 10.

(1.) A trader bought four pieces of broad-cloth: the first piece contained 246 yards, and the fourth 120 yards. How many yards did he buy?

	tens	hundreds	units
	2	4	6
	4	2	3
	2	0	0
	1	2	0

Amount     9   8   9

We write the numbers under one another, units under units, tens under tens, hundreds under hundreds. We then add the columns separately beginning at the right hand and place each result under the column added. Thus, the sum of the units 3 and 6 are 9; and we write the 9 under the column of units. We next add the column of tens; 2 and 2 are 4, and 4 are 8; we write the 8 under the column of tens. We next add the column of hundreds; 1 and 2 are 3, and 4 are 7, and 2 are 9; and we write 9 in the column of hundreds, making for the amount 989.

Examples for Practice.

(2)

(3)

(4)

(5)

thousands tens	hundreds units	3	3	2	1	2	3	4	6002	1111					
4	1	1	4	4	4	0	2	3	1304	2222					
1	2	0	2	1	4	0	2	1	1010	440					
1	1	4	0	2			2	1	1021	80122					
8				8				9				9			

(6.) James has 35 chestnuts, Franklin has 42, and John 21; what number have they altogether? Ans. 98 chestnuts.

(7.) A farmer has in store at one place 1125 bushels of wheat, at another 2341 bushels, and at another 6321. How many bushels of wheat has the farmer? Ans. 9787 bushels.

(8.) A drover bought three droves of cattle. The first contained 330, the second 425, and the third 244; how many cattle did he buy in all? Ans. 999.

Case II.

24. When the amount of any column equals or is greater than 10.

(1.) A gentlemen bought a pair of horses for 857 dollars, and a set of harness for 683 dollars; what did the whole amount to?

	hundreds	tens	units
	8	5	7
	6	8	3
		1	0
	1	3	
1	4		
Amount.	1	5	4
D		0	

Arranging the numbers as in the previous case, we add the columns of units which makes 10, and write 0 in the units place and 1 in the tens place. We then add the column of ten making 13 tens, the same as 1 hundred and 3 tens; write the 3 under

the column of tens and the 1 under the column of hundreds. We next add the column of hundreds which makes 14 hundred, the same as 1 thousand 4 hundred; write the 4 under the column of hundreds and 1 in the place of thousands. Adding the sum of these columns together we have the whole amount 1540. The following is the common method, of performing the above examples.

	hundred	tens	units
	8	5	7
	6	8	3
Amount.	1	5	4
			0

Instead of writing the sum of the units column, we write the unit figure 0, and add the 1 ten to the column of tens, making 14 tens, write the 4 under the column of tens, and add the 1 hundred to the column of hundreds, and inasmuch as this is the last column, we set down the whole sum 15, making for the amount 1540.

(2.) Five persons engage in speculation. A gains 866 dollars, B 599 dollars, C 756 dollars, D 225 dollars and E 981 dollars; what sum was gained by them all?

866
599
756
224
981
-----
3427

Commencing at the bottom of the units column 1 and 5 are 6, and 6 are 12, and 9 are 21, and 6 are

27; writing the 7 units under the column of units, we add the 2 tens to the column of tens, thus, 2 and 8 are 10, and 2 are 12, and 5 are 17, and 9 are 26, and 6 are 32; writing the 2 under the column of tens, we add the 3 hundreds to the column of hundred; thus, 3 and 9 are 12, and 2 are 14, and 7 are 21, and 5 are 26, and 8 are 34;

as this is the last column we write the whole amount 34, and we have for the sum 3427.

Examples for Practice.

(3)	(4)	(5)	(6)
25	291	3321	48256
81	356	4576	91725
96	985	1864	14963
67	426	9743	75655
21	777	9988	28400
18	343	1234	37075
<hr/>	<hr/>	<hr/>	<hr/>
308	3178	30726	296074

From the preceding illustrations we deduce the following:

*Rule. I. Write the numbers to be added, units under units, tens under tens, &c.*

*II. Add each column separately, beginning with the column of units, and write the sum underneath if it be less than 10.*

*III. If the amount of any column be 10 or more write the unit figure, and add the ten or tens figure to the next column. Finally, write down the whole sum of the left hand column.*

*Proof. Begin with the right hand or unit column and add the columns in a different direction from that in which they were first added: if the results agree, the work is supposed to be right.*

Examples for Practice.

(7)	(8)	(9)	(10)
25	250	8956	37125

175	300	9	4256
30	605	4008	321
19	1000	25	44
8	555	376	9
2156	2960	14	200
<hr/>	<hr/>	<hr/>	<hr/>
2413	5670		

(11.) John received at one time 85 peaches, at another 125, at another 256; how many did he receive?

(12.) A merchant sold in one day 250 dollars worth of breadcloth, 361 dollars worth of calico, and 857 dollars worth of worsted; how many dollars did he receive during the day?

(13.) A merchant bought a quantity of molasses for 1259 dollars and sold it so as to gain 599 dollars. For how much did he sell the molasses?

(14.) How many men are there in five regiments, if there are 763 in the first, 891 in the second, 915 in the third, 499 in the fourth, and 999 in the fifth?

#### Questions on Addition.

19. What are like numbers?

20. What are unlike numbers? Give examples of each.

21. What is addition?

22. What is the amount or sum?

23. Case I? How do you write the numbers to be added? Which column do you add first? Do you add all the other columns as you do the first?

24. Case II? Do you arrange the numbers for adding in this case, as in case I? When the sum of any column is more than 9 what is to be done? Recite the rule for addition? Proof?

#### Subtraction.

\_\_\_\_\_

25. *Subtraction* consists in taking one number from another equal to or greater than itself.

26. The *Minuend* is the number to be diminished by subtraction.

27. The *Subtrahend* is the number to be subtracted.

28. The *Remainder* or *Difference* is what remains after subtraction is performed?

29. *Unlike* numbers cannot be subtracted.

Case I.

30. When all the figures in the subtrahend are equal to or less than the figures in the same column in the minuend.

(1.) A man who had 897 dollars, spent 563 dollars for produce. How many dollars had he left?

Minuend 897  
Subtrahend 563

Remainder 334.

Write the less number under the greater, units under units, tens under tens, &c., and draw a line underneath. Commencing at the right hand, subtract each figure in the subtrahend from the one immediately above it in the minuend. thus in the units column, 3 from 7 leave 4, in the column of tens, 6 from 9 leave 3, and in the column of hundreds 5 from 8 leave 3, giving for the remainder 334.

Examples for Practice.

	(2)	(3)	(4)	(5)
Minuend	89	924	4784	9269
Subtrahend	75	513	2572	7258
Remainder	<u>14</u>	<u>411</u>	<u>2212</u>	<u>2011</u>

(6.) A trader bought 246 boxes of tobacco and sold 125 boxes; how many boxes had he left?

- (7.) If I owe a man 1496 dollars, and pay him 824 dollars, how much do I still owe him.
- (8.) From 6523 take 2121.
- (9.) from 17440 take 7220.
- (10.) A drover who had 14981 hogs killed 5861 in one week. How many hogs had he still to kill?

Case II.

31. When any figure in the subtrahend is greater than the corresponding figure in the minuend.

(1.) From 975 take 789.

Minuend 975  
Subtrahend 789

Remainder 186

If we increase both minuend and subtrahend by the same quantity the remainder will be unchanged, 5 being less than 9 we add 10 units to 5 making 15, 9 from 15 leaves 6. But as we have added 10 units or 1 ten to the minuend, it would be 1 ten too large, we must therefore add 0 ten to the 8 tens in the subtrahend making 9 tens. We cannot take 9 tens from 7 tens, so we add 10 tens or 100 to 7 tens making 17 tens; 9 tens from 17 tens leave 8 tens. Now having added 10 tens to the minuend, we must add 10 tens or 100 to the 7 hundreds, making 8 hundreds; 8 from 9 leave 1, for a remainder 186.

(2.) Subtract 48539 from 69732.

Minuend 69732  
Subtrahend 48539

Remainder 21193

*Proof.*

Subtrahend 48539  
Remainder 21193

Minuend 69732

10 and 2 are 12; 9 from 12 leave 3; add 1 ten to 3 making 4; inasmuch as 4 is larger than 3 above, add 10 tens to 3 making 13; 4 from 13 leave 9; add 1 hundred to 5

making 6; 6 from 7 leave 1, 8 from 9 leave 1, 4 from 6 leave 2. Answer 21193. If we add the subtrahend and remainder together we have the minuend, hence the work is correct.

Remark. Adding 10 to the minuend is something called borrowing ten, and adding 1 to the next figure of the subtrahend, carrying one.

	(3)	(4)	(5)	(6)
Minuend	391	9371	18579	695286
Subtrahend	264	3872	9645	469373
	_____	_____	_____	_____
Remainder	127	5499	_____	_____

32. We are now prepared to understand the following:

*Rule. I. Write the less number under the greater, placing units under units, tens under tens, &c.*

*II. Begin at the right hand, and take each figure of the subtrahend from the figure above it, and write the remainder underneath.*

*III. If any figure of the subtrahend be greater than the corresponding figure above it, add 10 to the upper figure before subtracting, and then add 1 to the next left hand figure of the subtrahend.*

*Proof. Add the subtrahend and remainder together; if their sum is equal to the minuend, the work is right.*

Examples for Practice.

—



1. George Washington was born in 1732 and died in 1799. How many years did he live?
2. Christopher Columbus discovered America in 1492 and it is now 1864. How long is it since the discovery of America.
3. A man who undertook a journey of 893 miles, has traveled 99 miles; how far has he yet to travel?
4. Quincy had 375 apples and gave William 185. How many apples had Quincy left?
5. From a farm in which there were 4681 acres, 2389 were sold; how many acres remained?
6. What will remain if you take fifteen thousand and fifty from nineteen thousand and eight?
7. A young man whose estate amounted to 7436 dollars paid 4500 dollars for a farm; how many dollars had he left?
8. A merchant bought cotton cloth to the amount of 19287 dollars, and linen to the amount of 13942 dollars. He sold the cotton cloth at a loss of 921 dollars; and the linen at a loss of 7653 dollars; for what sum was each sold?

#### Questions on Subtraction.

25. In what does subtraction consist?
26. What is the minuend?
27. What is the subtrahend?
28. What is the remainder?
29. Can you subtract numbers that are unlike?
30. What is case I? How are the numbers written? In what place do you begin to perform the subtraction? How subtract?
31. What is case II? When a figure in the upper number is smaller than the figure under it, what is to be done?
32. Recite rule for subtraction? Proof?

#### Multiplication.

---

33. *Multiplication* consists in repeating one of two given numbers, as many times as there are units in the other.
34. The *Multiplicand* is the number to be repeated.
35. The *Multiplier* is the number which shows how many times the multiplicand is to be repeated.
36. The *Product* is the result obtained by the process of multiplication.

Case I.

37. When there is only one figure in the multiplier.  
 (1.) What will 496 pounds of flour cost at 8 cents a pound?

Multiplicand	496
Multiplier	8
	48
	72
	32
Product	3968

Writing the multiplier under the units figure of the multiplicand, we then proceed as follows: 8 times 6 units are 48 units; 8 times 9 units are 72 tens; 8 times 4 hundreds are 32 hundreds the sum of which makes the product 3963. Instead of writing the product of each figure separately, we may write the units figure of each partial product, and carry the tens to the next partial product, as follows:

Multiplicand	496
Multiplier	8
Product	3968

8 times 6 are 48, write down the unit figure 8 and reserve the 4 tens to be added to the product of the tens figure: 8 times 9 are 72 and the 4 tens reserved

are 76 tens; we now write the 6 in the tens place and reserve the 7 hundreds to be added to the product of the hundreds' figure; 8 times 4 are 32 and the 7 reserved make 39 hundreds which we write, giving for the product 3968.

(2.) If one bushel of wheat cost 9 dollars, what will 856 bushels come to at that rate?

$$\begin{array}{r} \text{Multiplicand } 856 \\ \text{Multiplier } \quad 9 \\ \hline \text{Product } \quad 7704 \end{array}$$

9 times 6 are 54, write the 4 and carry the 5 to the next product; 9 times 5 are 45 and 5 are 50; write the 0 and carry the 5 to the next product; 9 times 8 are 72 and 5 are 77, and we have for the product 7704.

Examples for Practice.

	(3)	(4)	(5)	(6)
Multiplicand	125	371	784	23154
Multiplier	9	8	2	5
Product	<u>1134</u>	<u>2968</u>	<u>1568</u>	<u>115570</u>
	(7)	(8)	(9)	(10)
	95267	63914	271947	8961250
	6	4	3	7
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>

(11.) There are 5280 feet in one mile; how many feet are there in 5 miles?

(12.) How many seconds are there in 8 days, there being 86400 seconds in one day?

(13.) If there are 89 men in one company; how many men are there in 7 companies?

(14.) What will 35691 pounds of pork amount to, at 9 cents a pound?

(15.) What will be the cost of 45189 pounds of tallow at 4 dollars a pound?

38. When the multiplier consist of more than one figure.  
 (1.) Multiply 349 by 34.

$$\begin{array}{r}
 \text{Multiplicand } 349 \\
 \text{Multiplier } \quad 34 \\
 \hline
 \phantom{00}1396 \\
 \phantom{0}1047 \\
 \hline
 \text{Product } 11866
 \end{array}$$

Write the multiplier under the multiplicand, units under units, tens under tens, &c , multiply by each figure in the multiplier as in the former case; 4 times 9 are 36, write the 6 and carry the 3; 4 times 4 are 16 and 3 are 19, write 9 and carry the 1; 4 times 3 are 12 and 1 are 13, the whole of which we write. Again, 3 times 9 are 27, write the 7 under the multiplier and carry the 2; 3 times 4 are 12 and 2 are 14, write the 4 and carry 1; 3 times 3 are 9 and 1 are 10 which we write in full. Adding up these partial products we obtain the answer 11866.

Examples for Practice.

	(3)	(4)	(5)
Multiplicand	6422	2594	18199
Multiplier	42	56	207
Product	$\overline{12844}$ 25688	$\overline{15564}$ 12970	$\overline{127398}$ 36398
	(5)	(6)	(7)
	43256	71874	99525
	241	647	605
	$\overline{\hspace{1.5cm}}$	$\overline{\hspace{1.5cm}}$	$\overline{\hspace{1.5cm}}$

39. The above process embodied in a rule reads as follows:

Rule. I. Write the multiplier under the multiplicand, units under units, tens under tens, &c.

II. Multiply the multiplicand by each figure in the multiplier separately, beginning with the unit figure and write the first figure of each partial product under the figure by which you multiplied, writing down and carrying as in addition, and finally add the products. The sum will be the whole product.

Proof. Multiply the multiplier by the multiplicand; and if the product is the same as the first result, the work is correct.

Examples for Practice.

(8.) Multiply 5189 by 216.

Multiplicand	5189
Multiplier	216
	31134
	5189
	10378
Product	1120824

*Proof.*

216

5189

1944

1728

216

1080

1120824

(9.) Multiply 14506 by 2083.      Ans 30215998.

(10.) Multiply 45758 by 688.      Ans 31481504.

(11.) How many pages are there in 6952 books, if there be 221 pages in each book?

(12.) How many pages of paper will a clerk write over in 5 weeks, if he write 296 pages each week?

(13.) How far will sound travel in 126 seconds if it be known to travel 1142 feet in a second of time?

40. When the right hand figure or figures of the multiplier are ciphers, we multiply as before, writing the same number of ciphers to the right of the product.

(1.) Multiply 287 by 4200.

$$\begin{array}{r} 287 \\ 4200 \\ \hline 574 \\ 1148 \\ \hline 1205400 \end{array}$$

(2)

$$\begin{array}{r} 99 \\ 1000 \\ \hline 99000 \end{array}$$

(3)

$$\begin{array}{r} 255 \\ 800 \\ \hline 204000 \end{array}$$

41. If there are ciphers to the right of both multiplicand and multiplier, they may be disregarded until the multiplication is performed, and then bring down as many ciphers to the right of the product as there are ciphers on the right of both multiplicand and multiplier.

(1.) What is the product of 35200 multiplied by 3300.

	(2)	(3)
35200	913000	705000
3300	25	41000
<hr/>	<hr/>	<hr/>
1056	4565	705
1056	1826	2820
<hr/>	<hr/>	<hr/>
116160000	22825000	2890500000

(4.) The distance to the sun is 3800 times the earth's circumference, and the earth's circumference is about 25000 miles. How many miles is it to the sun?

(5.) The earth moves 68000 miles an hour in its orbit around the sun. How far will it move in its orbit during one day on 24 hours?

(6.) 60 geographical miles make one degree. How many miles are there in 360 degrees or the circumference of the earth?

(7.) How many yards are there in 400 miles, there being 1760 yards in one mile?

#### Questions on Multiplication.

33. In what does multiplication consist?

34. What is the multiplicand?

35. The multiplier?

36. The product?

37. Case I? Where do you write the multiplier? Which figure do you write down and which carry to the next product?
38. Case II?
39. Rule for multiplication I? II?
40. Proof?
41. When there are ciphers to the right of the multiplier or multiplicand how do you multiply? When there are ciphers to the right of both multiplicand and multiplier?

Division.

—

42. *Division* is the process of finding how many times one number contains another?  
43. The *Dividend* is the number to be divided?  
44. The *Divisor* is the number to divide by.  
45. The *Quotient* is the result obtained by division and shows how many times the divisor is contained in the dividend.  
46. The *Remainder* is the part of the dividend left after dividing, when the dividend does not contain the divisor an exact number of times. Thus 7 in 15, 2 times and 1 remainder.

Case I.

47. When the divisor consists of one figure.  
(1.) How many times are 3 contained in 969.

Divisor 3)969 Dividend.

Quotient 323

Write the divisor on the left of the dividend with a line between them. Begin at the left hand and say: 3 in 9, 3 times; write the number 3 under the 9; 3 in 6, 2 times, write 2 under 6; and 3 in 9 3 times, write the 3 under the 9 in the units' place and we have for a quotient 323.

- (2.) Divide 1684 by 4.

4)1684

—  
421

Inasmuch as 4 is not contained in 1 we take the next figure 6 with the 1 and say 4 in 16, 4 times, writing



the 4 in the hundreds' place, because the 16 is hundreds; then 4 in 8, 2 times, and in 4, 1 time. Ans. 421.

(3.) How often is 6 contained in 1254.

$$\begin{array}{r} 6)1254 \\ 209 \end{array}$$

6 in 12, 2 times, 6 in 5 no times, write a cipher in the tens' place, and then take the 5 and next figure 4 together, 6 in 54, 9 times.

(4.) How many times is 8 contained in 9849.

$$\begin{array}{r} 8)9849 \\ 1231 \dots 1 \text{ Remainder.} \end{array}$$

8 in 9, 1 time with 1 remainder, which united with the 8 makes 18; 8 in 18, 2 times, with 2 remainder, which united with 4 makes 24; 8 in 24, 3 times; 8 in 9, 1 time with 1 remainder. Ans. 1231 and 1 remainder. The 1 remainder has not been divided by 8, but we may represent the division by writing the 8 under the 1, thus  $1/8$ . Ans.  $1231 \frac{1}{8}$ .

$$\begin{array}{r} (5) \\ 9)22158 \\ \hline 2462 \end{array}$$

$$\begin{array}{r} (6) \\ 8)40948 \\ \hline 5123 \end{array}$$

$$\begin{array}{r} (7) \\ 7)4834 \\ \hline 690 \dots 4 \text{ Rem.} \end{array}$$

$$\begin{array}{r} (8) \\ 6)20976 \\ \hline 3496 \end{array}$$

$$\begin{array}{r} (9) \\ 5)81965 \\ \hline 16393 \end{array}$$

$$\begin{array}{r} (10) \\ 4)3450 \\ \hline 862 \dots 2 \text{ Rem.} \end{array}$$

From the foregoing we have the following:

*Rule I. Write the divisor on the left of the dividend with a line between them.*

*II. Beginning at the left hand, divide each figure of the dividend by the divisor and write the result under the dividend.*

*III. If there be a remainder after dividing any figure, prefix it to the figure of the next lower order in the dividend and divide as before. When any figure of the dividend is less than the divisor, write a cipher*

*in the quotient, and regard the number as prefixed to the figure of the next lower order in the dividend, and divide as before.*

*IV. If there be a remainder at the last lace it over the divisor at the right hand of the quotient.*

*Proof. Multiply the quotient by the divisor, and add the remainder, if any; and if the result be the dividend, the work is right.*

(11)  
Divisor 5)489265 Dividend.

97853 Quotient.

*Proof.*  
97853 Quotient.  
5 Divisor.  
489265 Dividend.

(12)  
9)296156

32906  
*Proof.*  
32906 Quotient.  
9 Divisor.

296154  
2 Remainder.

296156

#### Examples for Practice.

(13.) Divide 20956 by 7.

(14.) Divide 4102455 by 5.

(15.) Divide 47645 bushels of corn equally among 5 men; how many bushels will each receive?

(16.) If 4 weeks make one month, how many months are there in 3996 weeks?

- (17.) 12 months make one year; how many years are there in 22368 months?  
 (18.) How many bushels of wheat at 9 dollars a bushel, can be bought for 79486 dollars?

Case II.

48. When the divisor consists of two or more figures.  
 (1.) How often is 36 contained in 4428.

$$\begin{array}{r}
 \text{Dividend.} \\
 \text{Divisor. } 36 \overline{)4428} \text{ Quotient.} \\
 \underline{36} \\
 82 \\
 \underline{72} \\
 108 \\
 \underline{108} \\
 0
 \end{array}$$

We first find how many times 36 is contained in 44, and place the result in the quotient on the right of the dividend. We then multiply the divisor 36 by the quotient figure 1, and subtract the produce 36 from 44, the part of the dividend used, and to the remainder bring down the next figure 2 of the dividend, making 82 for a new dividend; 36 in 82, 2 times, multiply 36 by the new quotient figure 2, and subtract the product 72 from 82, and to the remainder 10 bring down the next figure of the dividend making 108; 36 in 108 3 times, multiplying and subtracting nothing remains, and we have for the whole quotient 123.

- (2.) How often is 53 contained in 21677.

$$\begin{array}{r}
 53 \overline{)21677} \text{ (409} \\
 \underline{212} \\
 477 \\
 \underline{477} \\
 0
 \end{array}$$

53 in 216, 4 times, 4 times 3 are 12, 4 times 5 are 20, and 1 carry makes 212, which subtracted from 216 leave 4; bring down the 7, 53 in 47 go no times; write 0 in the quotient and bring down the next 7; 53 in 477, 9 times 3 are 27, 9 times 5 are 45, and 2 are 47, making 447; hence the quotient is 409.

Divisor 18)119262(6625 Quotient.

$$\begin{array}{r}
 108 \\
 112 \\
 108 \\
 46 \\
 36 \\
 102 \\
 90 \\
 12 \text{ Remainder.}
 \end{array}$$

(4.) Divide 99711 by 88.

Divisor 88)99711(1133 Quotient.

$$\begin{array}{r}
 88 \\
 \hline
 117 \\
 88 \\
 \hline
 291 \\
 264 \\
 \hline
 271 \\
 264 \\
 \hline
 7 \text{ Remainder.}
 \end{array}$$

Hence we have the following

Rule. I. *Write the divisor at the left of the dividend, as in Case I and take enough of figures in the left of the dividend, to contain the divisor one or more times and place the quotient at the right of the dividends with a line between them.*

II. Multiply the divisor by this quotient figure, subtract the product from those figures of the dividend taken in dividing, and to the remainder, if any, bring down the next figure of the dividend. Divide as before, and set the quotient figure on the right of the previous one; if the divisor is not contained in any partial dividend, write 0 in the quotient, and bring down the next figure of the dividend as before.

III. If there be a remainder after dividing all the figures of the dividend, it must be written in the quotient with the divisor underneath.

Proof. Same as in Case I.

(5.) How many times are 96 contained in 99274.

$$\begin{array}{r}
 96)99274(1034 \\
 \underline{\phantom{96}96} \\
 394 \\
 \underline{\phantom{96}384} \\
 10
 \end{array}$$

Proof.  
 1034 Quotient.  
 96 Divisor.

$$\begin{array}{r}
 \underline{\phantom{96}6204} \\
 9306 \\
 \underline{\phantom{96}99264} \\
 10 \text{ Remainder.} \\
 \underline{\phantom{96}99274} \text{ Dividend.}
 \end{array}$$

Examples for Practice.

(6.) Find how many times 75 are contained in 8940.

(7.) Divide 104299 by 52.

(8.) Divide 92477 by 16.

(9.) Divide 40092 by 48.

(10.) A gentlemen sold a farm at 25 dollars an acre, and received 2050 dollars for it. How many acres in the farm?

(11.) A drover paid 450091 dollars for 4981 hogs. What was the price of one hog?

Ans. 90 801/4981 dollars.

49. When there are ciphers on the right of the divisor.

(1.) Divide 3392 by 100.

$$\begin{array}{r} 100)3292(32\ 92/100 \\ \underline{300} \\ 292 \\ \underline{200} \\ 92 \\ \hline 92\ \text{Remainder.} \end{array}$$

Shorter Method.

$$\begin{array}{r} 1,00)32,92 \\ \hline 32\ 92/100 \end{array}$$

(2.) Divide 85697 by 1600.

$$\begin{array}{r} 1600)85697(53\ 897/1600 \\ \underline{8000} \\ 5697 \\ \underline{4800} \\ 897 \\ \hline 897\ \text{Remainder.} \end{array}$$

Shorter Method.

16,00)956,97(53 879/1600

80

—  
56

48

—  
8

From the above examples we have the following

Rule. *Cut off as many figures from the right hand of the dividend as there are ciphers in the divisor. Under the figures so cut off, place the divisor and the whole will be the quotient. If there is a remainder after dividing, it must be prefixed to the figures cut off from the dividend for the true remainder.*

Examples for Practice.

(3.) Divide 2815 by 200. Ans. 14.....15 Rem.

(4.) Divide 921217 by 2500. Ans. 368....1217 Rem.

(5.) Divide 967 by 400.

(6.) Divide 876000 by 16000.

(7.) Divide 1325600 by 1700.

(8.) the sum of 105000 dollars is paid to an army of 42000 men: what does each man receive?

(9.) If the distance around the earth is 25000 miles, how many days will it take the man to travel around it, who travels 15 miles a day?

Questions on Division.

42. What is division?

43. The dividend?

44. The divisor?

45. The quotient?

46. The remainder?

47. Case 1? Rule I? II? III? IV? Proof?

48. Case II? Rule I? II? III?

49. Rule, when there are ciphers on the right of the divisor?

### Promiscuous Examples.

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1. Andrew Jackson was born in 1767, and lived 78 years; in what year did he die?
2. America was discovered in 1492, and now it is 1864; how long since the discovery?
3. If 7 men use a barrel of molasses in 187 days, how many days will a barrel last 1 man at the same rate?
4. If I give 282 dollars for a piece of cloth containing 47 yards, what is the price of 1 yard?
5. Three children inherited 6750 dollars; what was the share of each? Ans. 2250 dollars.
6. There are 365 days in a year, how many dollars a day must a man spend, to use an income of 4380 dollars a year? Ans. 12 dollars.
7. If a physician make 14 dollars a day, what will be the amount of his wages in 365 days, or one year?
8. A merchant bought 30 pieces of cotton containing 1290 yards, of which he has sold 14 pieces containing 602 yards. How many pieces and how many yards remain? Ans. 16 pieces and 688 yards.
9. Bought at one time 255 bushels of corn for 1275 dollars, and at another 300 barrels for 1500 dollars; how many barrels were bought, and for what sum of money? Ans. 555 barrels, for 2775 dollars.
10. A soldier traveled the first day 19 miles, the second 22 miles, the third 15 miles, the fourth 28 miles, and the fifth 33 miles; how far did he travel in the five days?
11. If I borrow 1822 dollars of a person, and pay him 929 dollars, how much do I still owe him?
12. If a man receive 1000 dollars a year salary and pay 250 dollars for board, 115 dollars for clothing, 45 dollars for books, and for other expenses 35 dollars, how much will he have left at the end of the year?



13. A farmer sold 235 bushels of potatoes at 5 dollars a bushel, for which he received 47 yards of cloth at 6 dollars a yard, 25 pounds of coffee at 2 dollars a pound and the balance in money; how much money did he receive;
14. Ellen taught school 10 months at 25 dollars a month, and paid 8 dollars a month for board, how much money did she save? Ans. 17 dollars.
15. Two girls are studying arithmetic, one works 25 examples a day, and the other 29 examples a day; how many examples will they both work in 15 days?
16. What is the remainder after dividing 124060000 by 43950.
17. A lady receives 188 dollars a year for weaving, and the expenses of her family are 173 dollars a year; how many dollars will she save in 4 years?
18. A school mistress hears 5 recitations before noon, and 7 in the evening; how many recitations will she hear in teaching 25 days, and how many more during evenings than mornings?
19. A plantation containing 800 acres was exchanged for another containing 655 acres and worth 40 dollars an acre. At what price per acre was the first plantation rated?
20. An army of 15000 men has provisions for 12 months. If 3000 more be added to this army, how long will the same stock of provisions supply the whole number, without any changes of rations? Ans 10 months.

## Fractions.

---

### DEFINITIONS, NOTATION AND NUMERATION.

50. If a unit, or the whole of any thing be divided into 3 equal parts, 1 of the parts is called *one half*.

If a unit be divided into 3 equal parts, one of the parts is called *one third*, 2 of the parts *two thirds*.

If a unit be divided into 4 equal parts, one of the parts is called *one fourth*, 2 of the parts *two fourths*, 3 of the parts *three fourths*.

Likewise if a unit be divided into 5 equal parts, 1 part is called *one fifth*, 2 parts *two fifths*, 3 parts *three fifths*, &c.

The parts are expressed by figures, thus:

$\frac{1}{2}$  one half.

$\frac{1}{3}$  one third.

$\frac{2}{3}$  two thirds.

$\frac{1}{4}$  one fourth.

$\frac{2}{4}$  two fourths.

$\frac{3}{4}$  three fourths.

$\frac{1}{5}$  one fifths.

$\frac{2}{5}$  two fifths.

$\frac{3}{5}$  three fifths.

$\frac{1}{6}$  one sixth.

$\frac{1}{7}$  one seventh.

$\frac{1}{8}$  one eighth.

$\frac{3}{8}$  three eighths.

$\frac{5}{9}$  five ninths.

$\frac{4}{10}$  four tenths.

$\frac{9}{10}$  nine tenths.

$\frac{6}{11}$  six elevenths.

$\frac{11}{12}$  eleventh twelfths.

If a unit be divided into any number of equal parts, one or more of these parts is a fraction of the whole number, and is called a fraction.

51. A *Fraction* is one or more of the equal parts of a unit.

52. If an apple be divided into 4 equal parts, the parts are called *fourths*, and 3 of these parts are called three fourths, and may be written

$\frac{3}{4}$  the number of parts taken.

4 the number of parts into which the apple is divided.

53. The *denominator* is the number below the line, and it shows the number of parts into which the unit is divided.

54. The *numerator* is the number above the line, and it shows how many parts are taken.

55. Fractions are either *proper* or *improper*. A *proper* fraction is one whose numerator is less than the denominator. Thus,  $\frac{1}{2}$ ,  $\frac{4}{6}$ ,  $\frac{9}{10}$ ,  $\frac{2}{20}$  are proper fractions.

An *improper* fraction is one whose numerator is equal to, or greater than the denominator. Thus  $\frac{5}{5}$ ,  $\frac{8}{8}$ ,  $\frac{22}{6}$  are improper fractions.

A *mixed number* is a whole number and a fraction expressed together. Thus,  $6\frac{1}{2}$ ,  $9\frac{2}{4}$ , and  $25\frac{2}{3}$  are mixed numbers.

### Reduction.

#### Case 1.

56. To reduce fractions to their lowest terms.

If an orange be divided into 4 equal parts, and then 2 of their parts be joined together, these 2-fourths are the same as 1-half. Hence the fraction  $\frac{2}{4}$  when reduced to its lowest terms is  $\frac{1}{2}$ .

A fraction is in its lowest terms, when no number greater than 1 will divide both numerator and denominator without a remainder.

(1.) Reduce the fraction  $12/72$  to its lowest terms.

2)  $12/72(6/36)$   $6/36(1/6)$  Ans.

Divide both terms of the fraction  $12/72$  by 2, and both terms of the result  $6/36$  by 6, and we have the lowest terms in which  $12/72$  can be expressed.

Instead of dividing by 2 and 6, we might have divided both numerator and denominator by 12, thus  $12/72(1/6)$  the largest number that would divide them. Hence the following rule for reducing fractions to their lowest terms.

*RULE. Divide both numerator and denominator, by the largest number that will divide them both without a remainder.*

#### EXAMPLES FOR PRACTICE.

2. Reduce  $2/6$  to its lowest terms. Ans.  $1/3$ .
3. Reduce  $3/9$  to its lowest terms. Ans.  $1/3$ .
4. Reduce  $6/8$  to its lowest terms. Ans.  $3/4$ .
5. Reduce  $12/32$  to its lowest terms. Ans.  $3/8$ .
6. Reduce  $18/45$  to its lowest terms.
7. Reduce  $77/121$  to its lowest terms.
8. Reduce  $288/300$  to its lowest terms.
9. Reduce  $455/1057$ .
10. Reduce  $4480/10000$  to its lowest terms.

57. To reduce an improper fraction to a whole or mixed number.

(1.) Reduce  $48/3$  to a whole number:

3) 48/16 Ans.

Since  $3/3$  equals 1, there are as many times 1 in  $48/3$  as is contained times in 48, which is 16. Hence,

RULE. *Divide the numerator by the denominator.*

#### EXAMPLES FOR PRACTICE.

(2.) Reduce  $12/3$  to a whole number. Ans. 4.

(3.) Reduce  $18/6$  to a whole number. Ans. 3.

(4.) Reduce  $32/8$  to a whole number.

(5.) Reduce  $60/12$  to a whole number.

(6.) Reduce  $1728/12$  to a whole number.

(7.) Reduce  $2167560/360$  to a whole number.

(8.) Reduce  $1258/23$  to a mixed number,

23)1258 (54 16/23 Ans.

115

—  
108

92

—  
16

Divide the numerator 1258 by the denominator 23 and it gives 54 as a quotient with 16 as a remaiud

er. That is 54 and 16 twenty thirds. Hence the  
RULE. *Divide the numerator by the denominator for the whole number and place the remainder over the denominator for the fractions.*

- (9.) Reduce  $47/7$  to a mixed number. Ans.  $6 \frac{5}{7}$ .
- (10.) Reduce  $10/3$  to a mixed number. Ans.  $1 \frac{1}{3}$ .
- (11.) Reduce  $99/12$  to a mixed number. Ans.  $8 \frac{1}{4}$ .
- (12.) In  $17/5$  of an hour, how many hours?
- (13.) In  $20/6$  of a pound, how many pounds?
- (14.) In  $922/5$  of a dollar, how many dollars?
- (15.) In  $7321/17$  weeks, how many weeks?
- (16.) Change  $47408/45$  to a mixed number.

Case III.

58. To reduce a mixed number to an improper fraction:

[1.] In  $12 \frac{3}{4}$  dollars, how many fourths of a dollar?

$$\begin{array}{r} 12 \frac{3}{4} \\ 4 \\ \hline 51 \quad \text{Ans.} \\ \hline 4 \end{array}$$

Since there are 4-fourths in 1 dollar, in twelve dollars there are 12 times 4-fourths, or 48-fourths, and the 3-fourths make 51-fourths. Hence we derive the following  
RULE. *Multiply the whole number by the denominator of the fraction; to the product add the numerator, and under the sum write the denominator.*

EXAMPLES FOR PRACTICE.

- [2.] Reduce  $4 \frac{2}{3}$  to an improper fraction. Ans.  $14/3$ .
- [3.] Reduce  $3 \frac{7}{8}$  to an improper fraction.
- [4.] Reduce  $12 \frac{7}{15}$  to an improper fraction.
- [5.] In  $25 \frac{1}{2}$  dollars, how many half dollars?
- [6.] In  $256 \frac{3}{4}$  dollars, how many fourths? Ans.  $1027/4$
- [7.] In  $365 \frac{1}{7}$  weeks, how many sevenths of a week?
- [8.] Change  $281 \frac{15}{25}$  to an improper fraction.
- [9.] Change  $18 \frac{9}{12}$  years to twelfths.

CASE IV.

59. To reduce a whole number to a fraction, having a given denominator.

- (1.) Reduce 128 yards to fourths.

$$\begin{array}{r} 128 \\ 4 \\ \hline 512 \\ \hline 4 \end{array}$$

Since in 1 yard there are 4 fourths, in 128 yards are 128 times 4-fourths, which are 512 fourths. Hence the following

*RULE. Multiply the whole number by the given denominator; take the product for a numerator, under which write the given denominator.*

EXAMPLES FOR PRACTICE.

- (2.) Reduce 63 to a fraction whose denominator is 8.
- (3.) Reduce 35 dollars to fourths. Ans.  $140/4$
- (4.) Reduce 63 gallons to fourths.

- (5.) Reduce 112 feet to twelfths. Ans.  $1344/12$   
 (6.) Reduce 225 miles to eights.  
 (7.) In 96 yards how many thirds?  
 (8.) Change 19 to the form of a fraction.  
 (9.) Change 145 to the form of a fraction.  
 (10.) In 396 how many halves?

CASE V.

60. To reduce two or more fractions to a common denominator.

(1.) Reduce  $4/5$  and  $2/3$  to a common denominator.

$$\begin{array}{r} 3 \text{ times } 4 \quad \underline{12} \qquad \qquad 5 \text{ times } 2 \quad \underline{10} \\ \qquad \qquad \text{are } 15 \qquad \qquad \qquad \qquad \text{are } 15 \\ 3 \text{ times } 5 \qquad \qquad \qquad \qquad 5 \text{ times } 3 \end{array}$$

Multiply both numerator and denominator of the first fraction,  $4/5$  by three, the denominator of the second, giving  $12/15$ ; and then multiply the second fraction  $2/3$  by the denominator 5, of the first, giving  $10/15$ . Ans.  $12/15$  and  $10/15$ .

Mixed numbers must first be reduced to an improper fraction.

(2.) Reduce  $2/3$ ,  $4 \frac{2}{5}$  and  $6/7$  to a common denominator,

$$\begin{array}{r} 4 \frac{2}{5} \\ 5 \\ \hline 22 \\ \hline 5 \end{array}$$

Reduce the  $4 \frac{2}{5}$  to an improper fraction by multiplying 4 by 5 and adding 2, giving  $22/5$ . Then the work is as in the 1st example. The fractions are  $2/8$ ,  $22/5$ , and  $6/7$ .



7 times 5 times 2      70.  
are 105

7 times 5 times 3

7 times 3 times 22      462.  
are 105

7 times 3 times 5

3 times 5 times 6      90.  
are 105

3 times 5 times 7

Multiply both terms of  $\frac{2}{3}$  by the product of the other denominators, 7 and 5, and we have  $\frac{70}{105}$ . Again, multiply both terms of  $\frac{22}{5}$  by the product of the other denominators 7 and 3, and we have  $\frac{462}{105}$ . Again, multiply both terms of  $\frac{6}{7}$  by the product of the other denominators 3 and 5, and we have  $\frac{90}{105}$ . Ans.  $\frac{70}{105}$ ,  $\frac{462}{105}$ ,  $\frac{90}{105}$ .

#### EXAMPLES FOR PRACTICE.

- (3.) Reduce  $\frac{2}{3}$ ,  $\frac{1}{2}$  and  $\frac{3}{5}$  to a common denominator.
- (4.) Reduce  $\frac{4}{7}$  and  $\frac{5}{6}$  to a common denominator. Ans.  $\frac{24}{42}$ ,  $\frac{35}{42}$ .
- (5.) Reduce  $\frac{4}{5}$ ,  $\frac{7}{8}$  and  $\frac{1}{2}$  to a common denominator.
- (6.) Reduce  $\frac{7}{8}$ ,  $\frac{9}{10}$ ,  $\frac{2}{11}$ , and  $\frac{3}{7}$  to a common denominator.
- (7.) Reduce  $\frac{4}{9}$ ,  $2\frac{1}{2}$ , and  $\frac{3}{7}$  to a common denominator.
- (8.) Reduce  $\frac{3}{4}$ ,  $6\frac{7}{8}$  and  $\frac{5}{12}$  to a common denominator.

61. (1.) What is the sum of  $\frac{3}{5}$ ,  $\frac{2}{5}$ ,  $\frac{1}{5}$  and  $\frac{4}{5}$ ?

The sum of  $\frac{3}{5}$ ,  $\frac{2}{5}$ ,  $\frac{1}{5}$ ,  $\frac{4}{5}$  is  $\frac{10}{5}$  Ans.

Since the given fractions have the same denominator 5, we add their numerators, placing 10, the sum over the denominator. Ans.  $\frac{10}{5}$  or 2.

(2.) What is the sum of  $\frac{2}{10}$ ,  $\frac{4}{10}$ ,  $\frac{6}{10}$ ,  $\frac{8}{10}$  and  $\frac{9}{10}$  Ans.  $2\frac{9}{10}$ .

(3.) What is the sum of  $\frac{3}{15}$ ,  $\frac{7}{15}$ ,  $\frac{9}{15}$ ,  $\frac{12}{15}$  and  $\frac{1}{15}$  Ans.  $2\frac{2}{15}$ .

(4.) What is the sum of  $\frac{9}{20}$ ,  $\frac{12}{20}$ ,  $\frac{16}{20}$  and  $\frac{18}{20}$ ? Ans.  $2\frac{3}{4}$ .

(5.) What is the sum of  $\frac{4}{180}$ ,  $\frac{7}{180}$ ,  $\frac{143}{180}$  and  $\frac{26}{180}$ ? Ans. 1.

(6.) What is the sum of  $\frac{4}{6}$  and  $\frac{3}{7}$ ?

First reduce  $\frac{4}{6}$  and  $\frac{3}{7}$  to a common denominator, thus:

7 times 4     28.

are 42

7 times 6

6 times 3     18.

are 42

6 times 7

We next add the numerators 28 and 18, making 46, and write the 46 over the common denominator 42. Ans.  $\frac{46}{42}$ , or reducing  $1\frac{2}{21}$ .

Hence the following

*RULE. Reduce the fractions to a common denominator, when necessary; add their numerators, and place the sum over the common denominator.*

(7.) What is the sum of  $\frac{2}{3}$  and  $\frac{3}{4}$ ? Ans.  $1\frac{5}{12}$ .

(8.) What is the sum of  $\frac{5}{5}$  and  $\frac{1}{3}$ ? Ans.  $1\frac{1}{6}$ .

(9.) Add  $\frac{4}{6}$ ,  $\frac{1}{4}$  and  $\frac{8}{9}$ . Ans.  $1\frac{29}{36}$ .

(10.) Add  $\frac{1}{2}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$ , and  $\frac{4}{5}$ . Ans.  $2\frac{43}{60}$ .

(11.) Add  $2\frac{1}{2}$ ,  $6\frac{2}{3}$  and  $8\frac{4}{5}$ .

Reduce  $\frac{1}{2}$ ,  $\frac{2}{3}$  and  $\frac{4}{5}$  to a common denominator, making  $\frac{15}{30}$ ,  $\frac{20}{30}$  and  $\frac{24}{30}$ , add the numerators: divide the numerator 59 by the denominator and we have for the sum of the fractions  $1\frac{29}{30}$ ; Add the whole numbers 2, 6, and 8, making 16, the sum of the whole number 16, and the sum of the fractions  $1\frac{29}{30}$  added, make  $17\frac{29}{30}$ . Ans.

To add mixed numbers:

RULE. *Add the fractions and the whole numbers separately, and then add their sum.*

(12.) What is the sum of  $12\frac{2}{3}$ ,  $8\frac{1}{2}$  and  $10\frac{3}{4}$ . Ans.  $31\frac{11}{12}$ .

(13.) What is the sum of  $\frac{5}{6}$ ,  $1\frac{7}{8}$  and  $3\frac{2}{3}$ . Ans.  $6\frac{9}{24}$ .

(14.) What is the sum of  $100\frac{5}{6}$  and 150.

(15.) What is the sum of  $\frac{6}{7}$ ,  $\frac{4}{5}$ ,  $\frac{2}{7}$  and 15.

(16.) What is the sum of  $121\frac{11}{23}$  and  $\frac{1}{2}$ .

### SUBTRACTION.

62. (1.) From  $\frac{5}{6}$  take  $\frac{2}{6}$ .

These fractions have the same denominator 6, hence we find the difference by subtracting their numerators; 2 from 5 leave 3, and writing the 3 over the denominator 6. Ans.  $\frac{3}{6}$  or  $\frac{1}{2}$ .

(2.) From  $\frac{7}{8}$  take  $\frac{3}{8}$ . Ans.  $\frac{1}{2}$

(3.) From  $\frac{12}{15}$  take  $\frac{9}{15}$ .

(4.) From  $\frac{39}{60}$  take  $\frac{35}{60}$ .

(5.) From  $\frac{18}{75}$  take  $\frac{11}{75}$ .

(6.) From  $\frac{15}{4}$  take  $\frac{7}{4}$ . Ans. 2.

(7.) From  $\frac{28}{3}$  take  $\frac{11}{3}$ .

(8.) From  $\frac{5}{6}$  subtract  $\frac{2}{3}$ .

Reduce  $\frac{5}{6}$  and  $\frac{2}{3}$  to a common denominator, making  $\frac{15}{18}$  and  $\frac{12}{18}$ ; then subtract the less numerator 12 from 15, the greater, and writ the difference 3 over the denominator 15. Ans.  $\frac{3}{15}$  or  $\frac{1}{5}$

*RULE. If the fractions have a common denominator, subtract their numerators; if not, reduce them to a common denominator, subtract their numerators, and write the remainder over the common denominator.*

#### EXAMPLES FOR PRACTICE.

(9.) Subtract  $\frac{1}{9}$  from  $\frac{1}{3}$ . Ans  $\frac{2}{9}$ .

(10.) Subtract  $\frac{4}{7}$  from  $\frac{4}{6}$ . Ans  $\frac{2}{21}$ .

(11.) Subtract  $\frac{3}{11}$  from  $\frac{4}{13}$ .

(12.) From  $\frac{5}{6}$  take  $\frac{3}{5}$ .

(13.) From  $\frac{3}{8}$  take  $\frac{2}{9}$ .

(14.) From  $5\frac{3}{4}$  take  $3\frac{1}{2}$ .

Reduce the fractional parts  $\frac{3}{4}$  and  $\frac{1}{2}$  to a common denominator,  $\frac{6}{8}$  and  $\frac{4}{8}$ , subtract the numerators,

4 from 6 leaves  $2/8$  or  $1/4$ ; also the whole number, 3 from 5 leaves 2. Ans.  $2\ 1/2$ .

(15.) From  $7\ 5/6$  take  $5\ 1/3$ . Ans.  $2\ 1/2$ .

(16.) From  $10\ 3/11$  take  $9\ 2/15$ . Ans.  $1\ 23/160$ .

(17.) From  $20\ 3/7$  take  $9\ 3/8$ .

(18.) From  $150\ 1/2$  subtract  $75\ 3/10$ .

(19.) Subtract  $216\ 9/20$  from  $391\ 7/30$ .

(20.) What is the difference between  $6\ 1/2$  and  $3\ 3/4$ .

$6\ 1/2$  is the same as  $6\ 4/8$ .

$3\ 3/4$  is the same as  $3\ 6/8$ .

          
 $2\ 3/4$  Ans.

Reduce the fractional parts,  $1/2$  and  $3/4$  to a common denominator, 8. We can not take  $6/8$  from  $4/8$ , therefore we add 1 or  $8/8$  to  $4/8$  making  $12/8$ , and then  $6/8$  from  $12/8$  leaves  $6/8$ . We now add 1 to 3 and say 4 from 6 leave 2. We thus have  $2\ 6/8$ , or reducing  $6/8$  to its lowest terms,  $2\ 3/4$ .

(21.) From  $7\ 1/2$  take  $4\ 7/9$ .

(22.) From  $14\ 5/6$  take  $11\ 5/7$ .

(23.) From  $22\ 1/3$  take  $13/17$ .

(24.) From 75 take  $51\ 2/3$ .

(25.) Subtract 334 from  $493\ 8/11$ .

(26.) Subtract  $23/45$  from  $140\ 5/6$ .

## MULTIPLICATION.

### Case II.

63. To multiply a fraction by a whole number.

(1.) If 1 pound of sugar cost  $\frac{2}{3}$  of a dollar, what will 4 pounds cost?

4 times  $\frac{2}{3}$  is  $\frac{8}{3}$  equal to  $2\frac{2}{3}$  Ans. Since 1 pound costs  $\frac{2}{3}$  of a dollar, 4 pounds will cost 4 times  $\frac{2}{3}$  which is  $\frac{8}{3}$ , equal to  $2\frac{2}{3}$  dollars.

Hence the following

RULE. *In order to multiply a fraction, multiply the numerator.*

### EXAMPLES FOR PRACTICE.

(2.) Multiply  $\frac{4}{5}$  by 7. Ans.  $5\frac{3}{5}$ .

(3.) Multiply  $\frac{8}{9}$  by 4. Ans.  $3\frac{5}{9}$ .

(4.) Multiply  $\frac{9}{16}$  by 12.

(5.) Multiply  $\frac{8}{9}$  by 4.

(6.) Multiply  $3\frac{1}{2}$  by 7.

$$\begin{array}{r} 3\frac{1}{2} \\ 7 \\ \hline 21 \\ 3\frac{1}{2} \\ \hline 24\frac{1}{2} \text{ Ans.} \end{array}$$

First multiply the whole number 3 by 7 making 21, then multiply the fractional part  $\frac{1}{2}$  by 7 making  $\frac{7}{2}$  equal to  $3\frac{1}{2}$  and add the the two products.

(7.) Multiply  $5\frac{2}{2}$  by 6.

(8.) Multiply  $8\frac{1}{2}$  by 9.

9.) Multiply  $12\frac{1}{2}$  by 12.

- (10.) What is the product of  $25 \frac{1}{8}$  and 20.  
 (11.) What is the product of  $\frac{8}{204}$  by 51.  
 (12.) What is the product of  $\frac{1}{12}$  and 144.

CASE II.

64. To multiply a whole number by a fraction.

(1.) if 1 yard of cloth cost 16 dollars, what will  $\frac{1}{4}$  of a yard cost?

$$4)16$$

$$\frac{4}{4} \text{ Ans.}$$

(2.) At 20 dollars a barrel, what will  $\frac{3}{4}$  of a barrel of flour cost?

$$4)20$$

$$\frac{5}{3}$$

$$\frac{15}{15} \text{ Ans.}$$

If 1 barrel or  $\frac{4}{4}$  cost 20 dollars,  $\frac{1}{4}$  of a barrel will cost  $\frac{1}{4}$  of 20 dollars, which is 5 dollars, and  $\frac{3}{4}$  of a barrel will cost 3 times what  $\frac{1}{4}$  costs; 3 times 5 are 15. Or,

$$\frac{20}{3}$$

$$4)60$$

$$\frac{15}{15} \text{ Ans.}$$

If 1 barrel cost 20 dollars, 3 barrels will cost 3 time

20, or 60 dollars, and  $\frac{1}{4}$  of 60 dollars is the same as  $\frac{3}{4}$  of 20 dollars. Hence the following

RULE. *Multiply the whole number by the numerator, and divide the product by the denominator.*

#### EXAMPLES FOR PRACTICE.

(2.) Multiply 5 by  $\frac{2}{3}$ . Ans.  $3\frac{1}{3}$ .

(3.) Multiply 8 by  $\frac{4}{9}$ . Ans.  $3\frac{5}{9}$ .

(4.) Multiply 20 by  $\frac{4}{5}$ .

(5.) Multiply 100 by  $\frac{2}{17}$ .

(6.) Multiply 32 by  $5\frac{3}{8}$ .

$$\begin{array}{r} 32 \\ 5\frac{3}{8} \\ \hline 160 \\ 12 \\ \hline 172 \end{array} \qquad \begin{array}{r} 32 \\ 3 \\ \hline 8)96 \\ \hline 12 \\ \hline \text{Ans.} \end{array}$$

We first multiply 32 by 5 giving 160, and then by  $\frac{3}{8}$  making 12, and add the two products together.

(7.) Multiply 34 by  $7\frac{3}{4}$ . Ans.  $263\frac{1}{2}$

(8.) Multiply 50 by  $13\frac{1}{2}$ .

(9.) Multiply 213 by  $25\frac{1}{4}$ .

(10.) Multiply 156 by  $\frac{27}{28}$ .

#### CASE III.

65. To multiply a fraction by a fraction.

(1.) At  $\frac{3}{4}$  of a dollar per bushel, what will  $\frac{2}{3}$  of a bushel of salt coast?

2 times 3 are 6 equal to 1 Ans.

8 times 4



If 1 bushel cost  $\frac{3}{4}$  of a dollar,  $\frac{1}{3}$  of a bushel will cost  $\frac{1}{3}$  of  $\frac{3}{4}$ , or  $\frac{3}{12}$  of a dollar, and  $\frac{2}{3}$  will cost 2 times  $\frac{3}{12}$ , which is  $\frac{6}{12}$ , or  $\frac{1}{2}$ .

(2.) Multiply  $5\frac{1}{4}$  by  $\frac{6}{7}$ .

$$5\frac{1}{4}$$

$$4$$

$$\frac{21}{4} \text{ times } \frac{6}{7} \text{ are } \frac{126}{28}, \text{ or } 4\frac{1}{2} \text{ Ans.}$$

Reduce  $5\frac{1}{4}$  to an improper fraction, and then multiply  $21/4$  by  $6/7$  as in Example 1.  
RULE. *Reduce all mixed numbers to improper fractions; then multiply the numerators together for a new numerator and the denominators together for a new denominator.*

#### EXAMPLES FOR PRACTICE.

(3.) Multiply  $5/6$  by  $2/7$ . Ans.  $10/42$ .

(4.) Multiply  $5/8$  by  $4/5$ . Ans.  $\frac{1}{2}$ .

(5.) Multiply  $14/37$  by  $25/43$ .

(6.) Multiply  $3\frac{1}{2}$  by  $5/6$ .

(7.) What is the product of  $\frac{1}{2}$ , of  $\frac{2}{3}$ , of  $\frac{3}{4}$ , of  $5/9$ ? Ans.  $5/36$ .

NOTE. – Of, between numbers, signifies, that those numbers are to be multiplied together.

(8.) Multiply  $8/15$  by  $3\frac{1}{4}$ .

(9.) What is the product of 3,  $\frac{1}{3}$  of  $2/9$ , and  $\frac{3}{5}$  of  $7/10$ ?

(10.) What is the value of  $2\frac{2}{3}$  times  $\frac{1}{4}$  of  $8/9$ ?

## DIVISION.

### CASE I.

66. To divide a fraction by a whole number.

(1.) If a man eat  $\frac{6}{10}$  of a loaf in 3 days, what part of a loaf will he eat in 1 day?

3 in  $\frac{6}{10}$ ,  $\frac{2}{10}$  times. Ans.

If in 3 days a man eats  $\frac{6}{10}$  of a loaf, in one day he will eat 1-third of  $\frac{6}{10}$ , which is  $\frac{2}{10}$  or  $\frac{1}{5}$ .

(2.) If 4 pounds of coffee cost  $\frac{5}{12}$  of a dollar, what will 1 pound cost?

$\frac{1}{4}$  of  $\frac{5}{12}$  is  $\frac{5}{48}$  Ans.

4    12    48

In this instance, we cannot exactly divide the numerator 5 by 3; but a fraction is divided by multiplying the denominator, for if you increase the denominator, which shows the number of parts into which unity is divided, the fraction is decreased, if the numerator, or the number of parts taken remain the same. Hence,

*RULE. To divide a fraction by a whole number, either divide the numerator, or multiply the denominator by the whole number.*

### EXAMPLES FOR PRACTICE.

(3.) Divide  $\frac{8}{9}$  by 4. Ans.  $\frac{2}{9}$ .

(4.) Divide  $\frac{9}{16}$  by 3.

(5.) Divide  $\frac{12}{15}$  by 5.

(6.) Divide  $\frac{75}{125}$  by 25.

(7.) Divide  $\frac{18}{21}$  by 13.

(8.) If 5 pounds of bacon cost  $8\frac{2}{3}$  dollars, what will 1 pound cost?

$$\begin{array}{r} 8\frac{2}{3} \\ 3 \\ \hline 26 \\ \hline 3 \end{array}$$

$\frac{1}{5}$  of  $\frac{26}{3}$  are  $\frac{26}{15}$  or  $1\frac{11}{15}$  Ans.

$$5 \quad 3 \quad 15 \quad 15$$

Reduce the mixed quantity to an improper fraction, and divide as before. Or we may perform the same operation as follows:

$$5) 8\frac{2}{3}$$

$$\frac{11}{15} \text{ Ans.}$$

We here say 5 in 8, 1 time with  $3\frac{2}{3}$  remainder. Reduce this remainder to an improper fraction  $\frac{11}{3}$ , which we divide by 5, as above, and annex the result  $\frac{11}{15}$  to the partial quotient 1, and we have  $1\frac{11}{15}$ .

(9.) Divide  $18\frac{1}{3}$  by 5. Ans.  $3\frac{10}{15}$ .

(10.) Divide  $9\frac{3}{4}$  by 9.

(11.) Divide  $100\frac{13}{47}$  by 4.

CASE II.

67. To divide a whole number by a fraction.

(1.) At  $\frac{3}{4}$  of a dollar a pound, what many pounds of butter can be bought for 15 dollars?

$$\begin{array}{r} 15 \\ 4 \\ \hline 3) 60 \\ \hline \end{array}$$

20 pounds.

As many pounds can be both for 15 dollars, as  $\frac{2}{4}$  are contained in 15. Bring 15 to fourths, and then we can divide by 30fourths; 4 times 15 are 60 fourths; 3-fourths in 60-fourths 20 times.

Hence to divide a whole number by a fraction,

*RULE. Multiply the whole number by the denominator, and divide the product by the numerator.*

EXAMPLES FOR PRACTICE.

(2.) Divide 36 by  $\frac{3}{8}$ . Ans. 96.

(3.) Divide 126 by  $\frac{7}{26}$ . Ans. 468.

(4.) Divide 60 by  $\frac{3}{12}$ .

(5.) Divide 240 by  $\frac{7}{10}$ .

(6. Divide 158 by  $\frac{6}{25}$ .

(7.) If a man can reap  $3\frac{2}{3}$  acres of land in a day, in how many days can he reap 22 acres?

$$\begin{array}{r} 3\frac{2}{3} \quad 22 \\ 3 \quad 3 \\ \hline 11 \quad 11)66 \\ \hline 3 \quad 6 \text{ Ans.} \end{array}$$

We reduce  $3\frac{2}{3}$  to an improper fraction, making  $11/3$  and then divide 22 by  $11/3$  as in the previous examples.

(8.) Divide 75 by  $12\frac{1}{2}$ . Ans. 6.

(9.) Divide 82 by  $21\frac{2}{4}$ .

(10.) Divide 320 by  $8\frac{2}{3}$ .

### CASE III.

68. To divide a fraction by a fraction.

(1.) How many pounds of sugar can be bought for  $5/6$  of a dollar, at  $2/3$  of a dollar a pound?

$\frac{5}{6}$  times  $\frac{3}{2}$  are  $\frac{15}{12}$  or  $1\frac{1}{4}$  Ans.

1 is contained in  $5/6$ ,  $5/6$  times, and  $1/3$  is contained in  $5/6$  3 times as many times as 1, which is 3 times  $5/6$  times, or  $15/6$  times; and  $2/3$  is contained  $1/2$  as many times as  $2/2$ ,  $1/2$  of  $15/6$  is  $15/12$ , or  $1\frac{1}{4}$ .

REMARK. – Now in this operation we have multiplied the numerator of the dividend by the denominator of the divisor, and the denominator of the dividend by the numerator of the divisor, as above. Hence

RULE. *Invert the divisor add proceed as in multiplication.*

### EXAMPLES FOR PRACTICE.

(2.) Divide  $6/7$  by  $2/3$ .

(3.) Divide  $4/8$  by  $1/6$ .

(4.) How many times is  $4/5$  contained in  $9/10$ ?

(5.) How many times is  $4/7$  contained in  $4\frac{5}{7}$ ?

$4\frac{5}{7}$   
7

$\frac{33}{7}$  times  $\frac{7}{4}$  are  $\frac{231}{28}$  or  $8\frac{15}{28}$  Ans.

Reduce  $4\frac{5}{7}$  to an improper fraction making  $\frac{33}{7}$ , invert the divisor,  $\frac{4}{7}$ , and multiply.

(6.) How many times are  $2\frac{1}{2}$  contained in  $6\frac{3}{4}$ ?

$$\begin{array}{r} 6\frac{3}{4} \quad 2\frac{1}{2} \\ 4 \quad 3 \end{array}$$

$$\begin{array}{r} \overline{27} \quad \overline{5} \\ 4 \quad 2 \end{array} \quad \begin{array}{l} 27 \text{ times } 2 \text{ are } 54 \text{ or } 2\overline{7} \text{ Ans.} \\ 4 \text{ times } 5 \quad 20 \quad 10 \end{array}$$

Reduce  $6\frac{3}{4}$  and  $2\frac{1}{2}$  to improper fractions, invert the divisor  $\frac{5}{2}$  and multiply.

(7.) How many times are  $5\frac{1}{2}$  contained in  $25\frac{1}{2}$ ?

(8.) How often are  $13\frac{3}{7}$  contained in  $28\frac{3}{7}$ ?

(9.) How many times are  $\frac{1}{9}$  contained in  $4\frac{1}{2}$ ?

(10.) How many times are  $6\frac{1}{2}$  contained in  $18\frac{3}{4}$ ?

### QUESTIONS ON FRACTIONS?

51. What is a fraction?
52. How is a fraction written?
53. What is the denominator?
54. The numerator? What does the denominator show? The numerator?
55. What is a fraction proper? An improper fraction? What is a mixed number?
56. What is case I? When is a fraction in its lowest terms? Rule?
57. Case II? Rule?
58. Case III? Rule?
59. Case IV? Rule?
60. Case V? Rule?
61. Rule for addition of fractions?
62. Rule for the subtraction of fractions?
63. Multiplication, case I? Rule?
64. Case II? Rule?
65. Case III? Rule?
66. Division, case I? Rule?
67. Case II?
68. Case III? Rule?

PROMISCUOUS EXAMPLES.

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1. Reduce  $882/924$  to its lowest terms.
2. Express in its simplest form  $2340/5300$ .
3. Express in its simplest form the quotient of 567 divided by 819.
4. Change  $843840/120$  to a whole number.
5. Change  $47408$  to a mixed number.
6. Change 527 to a fraction whose denominator shall be 12?
7. How many tenths of a dollar are there in 225?
8. Reduce 196 acres to fourths of an acre.
9. In  $30 \frac{5}{12}$  pounds, how many twelfths of a pound?
10. Reduce  $9 \frac{9}{12}$  to an improper fraction.
11. How many sevenths, in  $52 \frac{2}{7}$  weeks?
12. Reduce  $3/4$  and  $7/8$  to fractions having a common denominator.
13. Reduce  $9/17$ ,  $1/3$  and  $5/6$  to fractions having a common denominator.
14. Reduce  $3 \frac{7}{8}$ ,  $4/10$  and 5 to a common denominator.
15. Find the sum of  $3/10$ ,  $2/10$  and  $5 \frac{10}{10}$ .
16. A farmer had  $2/7$  of his sheep in one pasture,  $4/9$  in another and  $2/13$  in another; what part of his whole flock were in the three pastures?
17. What is the sum of  $6 \frac{2}{3}$ ,  $3/4$  and  $2/3$ ?

18. A man bought  $2\frac{5}{6}$  bushels of corn of one man, and  $5\frac{4}{9}$  bushels of another; how many bushels did he buy of both?
19. If I buy  $4\frac{1}{9}$  yards of cloth for a coat,  $2\frac{3}{5}$  yards for pants, and  $\frac{5}{6}$  of a yard for a vest, how many yards have I in all?
20. If I buy  $\frac{8}{9}$  of a quire of paper, and give away  $\frac{5}{9}$  of a quire, what part of a quire have I left?
21. If flour be bought for  $9\frac{1}{2}$  dollars a barrel and sold for  $12\frac{2}{3}$  dollars, what will be the gain per barrel?
22. A farmer having  $350\frac{6}{10}$  acres of land, sold  $205\frac{3}{7}$  acres; how many acres had he left?
23. What number added to  $3\frac{6}{7}$  will make  $10\frac{1}{4}$ ?
24. What fraction added to  $\frac{5}{6}$  will make  $\frac{9}{10}$ ?
25. If a lady earn  $7\frac{5}{6}$  dollars in a week, how many dollars will she earn in 18 weeks?
26. If 1 yard of muslin cost  $\frac{9}{10}$  of a dollar; what will 15 yards cost?
27. At 12 dollars a gallon, what will  $\frac{5}{9}$  of a gallon cost?
28. At 24 dollars a ream, what will  $3\frac{3}{8}$  reams of paper cost?
29. At  $\frac{7}{9}$  of a dollar a yard, what will be the cost of  $\frac{2}{7}$  of a yard?
30. If a man own  $\frac{2}{3}$  of a vessel and sell  $\frac{5}{8}$  of what he owns, what part of the whole vessel will he sell?
31. What will  $8\frac{5}{6}$  cords of bark cost at  $3\frac{2}{5}$  dollars per cord.
32. What will  $5\frac{1}{2}$  pounds of pork cost at  $5\frac{1}{2}$  cents per pound?
33. If 8 pounds of beef cost  $\frac{3}{4}$  of a dollar, how much will 1 pound cost?



34. If 12 bushels of barley cost  $6\frac{2}{3}$  dollars, how much will 1 bushel cost?
35. If 8 soldiers consume  $10\frac{3}{5}$  pounds of flour in a day, how much does each man consume?
36. How many bushels of potatoes, worth  $\frac{3}{5}$  of a dollar per bushel, will pay for  $\frac{2}{3}$  of a barrel of pork worth 12 dollars a barrel?
37. If a man chop  $2\frac{2}{3}$  cords of wood in a day, how many days will it take him to chop 18 cords?
38. How many pounds of rice can be bought for  $\frac{12}{13}$  of a dollar, at  $\frac{3}{4}$  of a dollar a pound?
39. If a man spend  $2\frac{3}{5}$  dollars per day, in what time will he spend  $15\frac{2}{3}$  dollars?
40. If a horse eat  $\frac{3}{8}$  of a bushel of oats in a day, in how many days will he eat  $10\frac{3}{4}$  bushels?
41. A certain sum of money is to be divided among 4 persons; A is to have  $\frac{1}{3}$ , B  $\frac{1}{4}$ , C  $\frac{1}{5}$ , and D the remainder, which was 26 dollars; what is the whole sum to be divided?
42. What number divided by  $2\frac{3}{4}$ , will give a quotient of  $15\frac{1}{2}$ ?
43. In an orchard  $\frac{2}{3}$  of the trees are apple trees,  $\frac{1}{12}$  peach trees, and the remainder are plum trees, which are 18 more than  $\frac{1}{8}$  of the whole; how many trees in the orchard?

## Confederate Currency.

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69. *Currency* is coin, bank bills, Confederate notes, treasury notes, &c., in circulation.

70. *Coin* is money stamped, having a value established by law.

### NOTATION AND NUMERATION.

71. The gold coins of the Southern Confederacy are the double eagle, eagle, half eagle and quarter eagle, three dollar piece, and dollar.

The silver coins are the three cent piece, dime and half dime, dollar, half and quarter dollar.

#### TABLE.

10 mills (m)	make	1 cent,	c.
10 cents	“	1 dime,	d.
10 dimes	“	1 dollar,	\$.
10 dollars	“	1 eagle,	e.

The unit of money in the Southern Confederacy is the dollar.

Dimes are not read as dimes, but as cents; thus four dimes are read 40 cents; five dimes and eight cents are read 58 cents.

When dollars, mills, and cents are expressed together they are separated by a dot. Thus fifteen dollars twenty-five cents seven mills are written \$15.257.

(1.) Write 2 dollars twenty-five cents. Ans. 2.25.

(2.) Write eighteen dollars seventy-five cents.

(3.) Write one hundred dollars ninety-nine cents.

(4.) Write sixty-seven dollars eighteen cents nine mills.

NOTE. – Since 100 cents make 1 dollar, there can be only two places for cents; if then the cents are less than 10, a cipher must be written on the left hand of the figure that expresses the cents.

If there are mills and no cents, two ciphers must occupy the place of cents.

- (5.) Write five dollars three cents. Ans. \$5.03.
- (6.) Write ten dollars eight cents.
- (7.) Write fifty dollars six cents four mills. Ans. \$50.064.
- (8.) Write eight dollars ninety-six cents two mills.
- (9.) Write twenty-one dollars seven mills. Ans. \$21.007.
- (10.) Write five dollars five mills.
- (11.) Write forty-five cents. Ans. 45 cts.
- (12.) Write seventy-five cents.

#### REDUCTION.

72. The equivalents of a dollar, as seen from the table, are 100 cents and 1000 mills; also 10 mills make 1 cent. Hence to change dollars to cents, annex two ciphers. To change dollars to mills, annex three ciphers.

#### EXMAPLES FOR PRACTICE.

- (1.) Change 36 dollars to mills. Ans. 36000 mills.
- (2.) In 256 dollars how many mills?
- (3.) In 96 cents how many mills?
- (4.) In 25 cents how many mills?
- (5.) Reduce 196.45 dollars to cents. Ans. 19645 cents.
- (6.) In 9.09 dollars how many cents.

73. To change cents to dollars, point off two figures from the right. To change mills to dollars, point off one figure for mills and two for cents.

#### EXAMPLES FOR PRACTICE

- (1.) Change 795 mills to cents. Ans. 79.5 cents.
- (2.) Change 981 mills to cents.
- (3.) Reduce 498 cents to dollars. Ans. \$4.98.
- (4.) Reduce 2978 cents to dollars.

- (5.) In 14127 mills, how many dollars? Ans. \$14.127.  
 (6.) In 8972 mills, how many dollars?

ADDITION.

74. (1.) What is the sum of 20 dollars 75 cents, 100 dollars 50 cents, 30 dollars 8 mills, 65 cents 9 mills, 55 dollars 18 cents 7 mills?

$$\begin{array}{r}
 20.75 \\
 100.50 \\
 30.008 \\
 659 \\
 \hline
 55.187
 \end{array}$$

Ans. \$207.104

RULE. Write dollars under dollars, cents under cents, mills under mills. Add as in simple numbers and point off one place for mills and two places of figures for cents.

(2.) Add together 46 dollars, 96 dollars 86 cents, 219 dollars 15 cents, 9 dollars 99 cents 9 mills.

(3.) A lady bought a dress for 30 dollars 62  $\frac{1}{2}$  cents, a bonnet for 16 dollars 12  $\frac{1}{2}$  cents, a parasol for 6 dollars 87  $\frac{1}{2}$  cents, and a pair of gloves for 4 dollars and 50 cents; how much did the whole cost her?

(4.) A farmer sold 56 dollars worth of wheat, 94 dollars 37  $\frac{1}{2}$  cents worth of corn, 27 dollars 75 cents 4 mills worth of oats; how much did he receive for his grain?

SUBTRACTION.

75. (1.) A man bought a horse for 64 dollars 49 cents and sold him for 73 dollars 64  $\frac{1}{2}$  cents; what did he gain?

$$\begin{array}{r}
 73.64 \frac{1}{2} \\
 64.49 \\
 \hline
 \text{Ans. } 9.15 \frac{1}{2}
 \end{array}$$

RULE. *Write the subtrahend under the minuend, dollars under dollars, cents under cents, &c. Subtract as in simple numbers and place the point in the remainder, directly under the points in the given numbers.*

- (2.) From 25 dollars 1 mill take 19 dollars 9 cents 9 mills.
- (3.) From 200 dollars take 1 dollar 1 cent 1 mill.
- (4.) From 1 dollar subtract 1 mill.
- (5.) From 450 dollars take 25 cents.
- (6.) A man bought a horse for 250 dollars, and a carriage for 175 dollars 87 ½ cents; what did the horse cost more than the carriage?
- (7.) A merchant went to Wilmington having 3956 dollars; he gave 2019 dollars for calico, and 299.52 ½ dollars for groceries; how much money had he left?

MULTIPLICATION.

76. (1.) If a bushel of wheat cost \$5.375, what will 25 bushels cost?

$$\begin{array}{r} \$5.375 \\ 25 \\ \hline 26.875 \\ 107.50 \\ \hline \text{Ans. } \$134.375 \end{array}$$

RULE. *Multiply as in simple numbers, and from the right hand of the product, point off as many places of figures as there are places in the multiplicand and multiplier taken together.*

- (2.) What is the cost of 20 yards of cloth at \$4.50 per yard?
- (3.) What is the value of 15 pounds of tea at \$9.12 ½ per pound?
- (4.) What is the value of 36 pounds of coffee, at \$1.1.25 per pound?

- (5.) If a man spend 65 cents a day, how much will he spend in 365 days?  
 (6.) at \$6.75 an acre, what is the value of 972 acres of land?

DIVISION.

77. (1.) If 2 barrels of molasses cost \$44.75, what will 1 barrel cost?

$$\begin{array}{r} 2)44.75 \\ \hline 22.37 \frac{1}{2} \end{array}$$

RULE. *Divide as in simple numbers, and from the right hand of the quotient point off as many places as the places pointed off in the dividend exceed those in the divisor.*

- (2.) If 125 yards of broadcloth cost \$650, how much will 1 yard cost? We change the 650 dollars to cents by annexing two ciphers and then dividing by 125; the answer will be in dollars and cents.  
 (3.) At 12 cents a piece, how many oranges can be bought for \$1.56?  
 (4.) If 45 gallons of wine cost \$191.475 what will 1 gallon cost?  
 (5.) A farmer sells 200 pounds of pork at 12 ½ cents a pound, for which he receives 150 pounds of sugar; what is the price of the sugar per pound?  
 (6.) How many pounds of butter can be bought for \$15.75 if one pound cost 15 cents?  
 (7.) What will 8956 feet of plank cost at \$1.25 per thousand feet?  
 (8.) What will 1250 bushels of apples cost at 12 ½ cents a bushel?

QUESTIONS

69. What is currency?  
 70. What is coin?

71. Name the gold coins. The silver coins. Repeat the table. What is the unit of money? How are dimes read? How are dollars, mills and cents expressed together? When the cents to be written with dollars are less than 10, what is to be done? If there are mills and no cents, what is to be done?
72. Name the equivalents of a dollar? How do you change dollars to cents? How dollars to mills?
73. How do you change cents to dollars? Mills to dollars?
74. Rule for addition?
75. Rule for subtraction?
76. Rule for multiplication?
77. Rule for division?

#### PER CENTAGE.

78. The term *Per cent.* signifies by the hundred. Thus, by 2 per cent. is meant 2 cents of every 100 cents, 2 dollars of every 100 dollars, 2 pounds of every 100 pounds, &c.
79. Since 1 per cent. is  $\frac{1}{100}$ , 2 per cent.  $\frac{2}{200}$ , 3 percent.  $\frac{3}{300}$ , percent. may be written as cents and mills are written. Thus, 6 per cent. is 06, 5  $\frac{1}{5}$  per cent. is 055,  $\frac{3}{4}$  percent is 0075.

#### EXAMPLES FOR PRACTICE.

- (1.) Write 2 per cent.; 6 per cent.; 10 per cent.; 12 per cent.; 50 per cent.'
- (2. Write 2  $\frac{1}{2}$  per cent.; 9  $\frac{3}{4}$  per cent.; 12  $\frac{1}{2}$  per cent. 18  $\frac{3}{4}$  per cent.; 25  $\frac{2}{3}$  per cent.
- (3.) Write  $\frac{1}{2}$  per cent.; 2.3 per cent.; 3.4 per cent.;  $\frac{1}{6}$  per cent.;  $\frac{3}{8}$  per cent.

#### CASE I.

80. To find the per centage of any number.

(1.) What is 6 per cent. of 250 dollars?

$$\begin{array}{r} \$250 \\ 06 \\ \hline \$15.00 \end{array}$$

Since 6 percent. is equal to 06, 6 per cent. of 250 dollars is 06 times 250 dollars, equal to 15 dollars.

RULE. *Multiply the given number or quantity by the rate per cent, and point off as many places of figures in the product as there are places pointed off in both multiplicand and multiplier.*

(2.) A man having 225 dollars lost 5 per cent. of it; how many dollars did he lose?

(3.) What is  $3\frac{1}{2}$  per cent. of %25.75?

(4.) What is 14 per cent. of 156?

(5.) What is  $6\frac{3}{4}$  per cent. of \$1275?

(6.) What is  $9\frac{4}{5}$  per cent. of 450 men

(7.) What is  $\frac{2}{3}$  per cent. of \$100?

(8.) what is  $\frac{1}{4}$  per cent. of \$10?

(9.) Find  $1\frac{2}{3}$  per cent. of \$35.15?

(10.) A Farmer, having 600 bushels of corn, sold 30 per cent. of it and kept the remainder; how much did he keep?

(11.) A man has a capital of \$15250; he invests 15 per cent. of it in Confederate bonds; how much does he keep?

#### CASE II.

81. to find what per cent. one number is of another.

(1.) A man having \$180, gave away \$9; what per cent, of his money did he give away?

$$\begin{array}{r} 180)900(05 \text{ Ans.} \\ 900 \\ \hline \end{array}$$



Since 100 per cent. is the whole of any number, \$180 is 100 per cent. of his money, and \$9 is  $\frac{9}{180}$ , that is divide \$9 by \$180 and we have 05, or 5 per cent.

*RULE. Divide the number expressing the percentage by the other and the quotient will be the per cent.*

- (2.) What per cent. of \$450 is \$18?
- (3.) What per cent. of \$4 is 30 cents?
- (4.) What per cent. of 500 head of cattle is 40 head?
- (5.) What per cent. of \$240 is \$13.20?
- (6.) From a barrel of sugar containing 460 pounds, 230 pounds were sold; what per cent was sold?

### CASE III.

82. To find a number when a certain per cent. of it is given.

- (1.) A man gave away \$9, which was 5 per cent. of all the money he had; how much had he at first?

$$\begin{array}{r} 05 \overline{)9.00(180} \\ \underline{5} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

If we wish to find 5 per cent. of \$180 we multiply \$180 by 05 giving \$9. Therefore if we divide \$9 by 05 we will obtain \$180 the amount the man had at first. Hence  
*RULE. Divide the number expressing the per cent. by the rate per cent. and the quotient will be the number required.*

- (2.) 24 are 2 per cent. of what number?
- (3.) 63 are 9 per cent. of what number?
- (4.) 75 are  $12\frac{1}{2}$  per cent. of what number

- (5.) 66 are 24 per cent. of what number?  
(6.) A farmer sold 60 hogs which was 15 per cent. of his whole stock; how many hogs had he at first?  
(7.) I loaned a man a certain sum of money; he paid me 250 dollars which was 6 per cent of the whole sum loaned to him; how much did I loan him?

#### QUESTION.

78. What does the term per cent. signify?  
79. How many per cent. be written?  
80. Case I. Rule?  
81. Case II. Rule?  
82. Case III. Rule? What is 1 per cent. of 1 dollar 5 per cent. of 1 dollar? What is 1 per cent. of 10 dollars: 5 per cent. of 100 dollars? What is 50 per cent. of 160 dollars? What per cent. of 100 dollars is 50 dollars?

#### SIMPLE INTEREST.

83. *Interest* is a sum paid for the use of money.  
84. The sum for the use of which interest is paid is called the *principal*.  
85. The sum per cent. paid for one year's interest is called the *rate*.  
86. The *Amount* is the sum of the principal and interest.  
87. *Simple Interest* is the sum paid for the use of the principal only during the time.  
88. Legal interest is the rate per cent. established by land.  
The legal rate in North Carolina, Virginia, Tennessee, Missouri, Maryland, Kentucky and Arkansas is 6 per cent. In South Carolina the rate is 7 per cent. In Alabama, Florida, Georgia, Mississippi and Texas the rate is 8 per cent.

CASE I.

89. To find the interest on any sum, at any rate per cent. for years and months.

(1.) What is the interest of \$120 for 4 years 6 months at 6 per cent.

$$\begin{array}{r} \$120 \\ 06 \\ \hline 7.20 \\ 4 \frac{1}{2} \\ \hline 2880 \\ 360 \\ \hline \$32.40 \end{array}$$

Multiplying the principal \$120 by 06 gives the interest for 1 year, and the interest for 4 years 6 months is  $4 \frac{6}{12}$  equal to  $4 \frac{1}{2}$  times the interest for 1 year, or  $4 \frac{1}{2}$  times \$7.20, which is \$32.40. Hence the following:

*RULE. Multiply the principal by the rate per cent. and the product will be the interest for 1 year. Multiply the interest for 1 year by the time in years and the fraction of a year, and the result will be the required interest.*

EXAMPLES FOR PRACTICE

- (2.) What is the interest of \$300 for 3 years at 5 per cent.?
- (3.) What is the interest of /4250 for 2 years 3 months at 8 per cent.?
- (4.) What is the interest of \$54.60 for 2 years 4 months at 7 per cent.?
- (5.) What is the interest of \$3000 for 9 months at 8 per cent.?
- (6.) What is the amount of \$5040 for 5 years 1 month at  $6 \frac{1}{2}$  per cent.?

(7.) What is the amount of \$75.25 for 1 year 10 months at 8 per cent.?

Case II.

90. To find the interest on any sum, for any time, at any rate per cent.?

(1.) What is the interest on \$252.38 for 3 years 7 months 17 days, at 8 per cent.?

$$\begin{array}{r}
 12 \overline{) 252.38} \\
 \underline{210.3} \\
 43.5 \frac{2}{3} \\
 \underline{10515} \\
 6309 \\
 8412 \\
 \underline{1402} \\
 9.16207 \\
 08
 \end{array}$$

Ans.  $\underline{\$73.29656}$

Remove the point in the given principal two places to the left, and we have \$2.5238, the interest for 1 year at 1 per cent.; for if we multiply by 1 per cent (01), the value of the principal will only be changed in the removal of the point two places to the left. Dividing this by 12, we have .2103, the interest for 1 month at 1 per cent. In 3 years and 7 months there are 43 months; 17 days are 17.30 of a month; or dividing 17 by 3 we have 5  $\frac{2}{3}$ ; writing 5  $\frac{2}{3}$  with 43, a point between, we have 43.5  $\frac{2}{3}$ , for the months and parts of a month. Multiplying by 43.5  $\frac{2}{3}$ , we have \$9.16207, the interest for the whole time at 1 per cent. 8 per cent. will be 8 times this product or \$73.29656 Ans. Hence the following

*RULE. Remove the separating point in the given principal two places to the left, and the result will be the interest for 1 year at 1 per cent. Divide this interest*

*by 12, and the result will be the interest for 1 month at 1 per cent. Multiply this interest by the time expressed in months and tenths of a month, and the result will be the interest for the given time at 1 per cent.*

*Multiply this interest by the given rate, and the result will be the interest required.*

#### EXAMPLES FOR PRACTICE.

- (2.) What is the interest of \$200 for 4 years 6 months at 6 per cent.?
- (3.) What is the interest of \$35.42 for 3 years 1 month at 5 per cent.?
- (4.) What is the amount of \$250 for 1 year 2 months and 15 days at 8 per cent.?
- (5.) What is the interest of \$15.12  $\frac{1}{2}$  for 10 months and 6 days at 2 per cent.?
- (6.) What is the interest, of \$510 for 25 days at 7 per cent.?
- (7.) If I borrow \$175 at 6 per cent. how much will I owe after 7 months 12 days?
- (8.) How much is the interest on a note of \$228.75 in 3 years 3 months and 3 days, at 6 per cent.?
- (9.) In settling with a tanner, I gave my note for \$47.55 due in 9 months and 2 days, at 8 per cent.; what must be paid when the note becomes due?
- (10.) What is the amount of 10 dollars for 10 years 10 months at 6 per cent.?
- (11.) What is the amount of \$1000 for 25 days at 6  $\frac{1}{2}$  per cent.?
- (12.) Give the interest on \$75 from Jan. 1, 1864 to June 1, 1864.

#### QUESTIONS.

83. What is interest?
84. What is the principal?
85. What is the sum per cent. called?
86. The amount?
87. Define simple interest?

88. What is the legal rate of interest in North Carolina?

89. Case I. Rule?

90. Case II. If you remove the separating point two places to the left, what will the result be? If you divide this interest by 12, what will the result be? If you multiply this interest by the time expressed in months and tenths of a month, what will the result be? And then if you multiply this interest by the given rate, what will be the result? Repeat the rule?

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Compound Numbers.

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REDUCTION.

91. A *compound number* is a number whose value is expressed in two or more denominations.

92. *Reduction* consists in changing a number from one denomination to another, without altering its value.

WEIGHTS.

93. *Weight* is a measure of the quantity of matter in a body, determined by some fixed standard.

Three kinds of weight are used in the Southern Confederacy. We shall only introduce the weight most commonly used in weighing, called,

AVOIRDUPOIS WEIGHT.

16 drams (dr.) make 1 ounce oz.

16 ounces " 1 pound lb.

100 pounds " 1 hundred weight cwt.

20 cwt. or 2000 lb. " 1 ton T.

Scale – ascending 16, 16, 100, 20; descending 20, 100, 16, 16

(1.) In 15 T. 10 cwt. 70 lb. how many pounds?

$$\begin{array}{r} 15 \text{ T. } 10 \text{ cwt. } 70 \text{ lb.} \\ 20 \\ \hline 310 \text{ cwt.} \\ 100 \\ \hline 31070 \text{ lb. Ans.} \end{array}$$

(2.) 31070 pounds, how many tons?

$$\begin{array}{r} 100)31070 \\ \hline 20)310 \text{ cwt. rem. } 70 \text{ lb.} \\ \hline 15 \text{ T. rem. } 10 \text{ cwt.} \end{array}$$

(3.) Reduce 6 tons 15 cwt. 43 lb. 10 oz., to ounces.

(4.) Reduce 216864 ounces to tons.

(5.) A farmer bought 5 T. 18 cwt. 40 lb. of hay at 15 cents a pound; how much did it cost him?

(6.) How much will 4600 lb. of hay cost at \$12 per ton?

(7.) If a person buy 12 T. 8 cwt. 50 lb. 10 oz. 6 dr. of iron at 2 cents a dram, how much will it cost?

(8.) At 50 dollars a ton what will 3600 pounds of iron cost?

## MEASURES OF EXTENSION.

### *Long Measure.*

94. Long measure is used in measuring lines or distances.

### *Table.*

12 inches (in.) make 1 foot ft.

3 feet " 1 yard yd.

5 ½ yards " 1 rod rd.

40 rods " 1 furlong fur.

8 furlongs " 1 mile mi.

Scale – ascending 12, 3, 5 ½, 40, 8; descending 8, 40, 5 ½, 12.

EXAMPLES FOR PRACTICE.

1.) In 4 mi. 3 fur. 30 r. 2 yd. 1 foot, how many inches?

$$\begin{array}{r}
 4 \text{ mi. } 3 \text{ fu. } 30 \text{ rd. } 2 \text{ yd. } 1 \text{ ft.} \\
 8 \\
 \hline
 35 \text{ fur.} \\
 40 \\
 \hline
 1430 \text{ rd.} \\
 5 \frac{1}{2} \\
 \hline
 7152 \\
 715 \\
 \hline
 7867 \text{ yd.} \\
 3 \\
 \hline
 23602 \text{ ft.} \\
 12 \\
 \hline
 283224 \text{ in. Ans.}
 \end{array}$$

(2.) in 283224 inches how many miles?

$$\begin{array}{r}
 12)283224 \\
 \hline
 3)23602 \\
 \hline
 5 \frac{1}{2})7867 \text{ rem. } 1 \text{ ft.} \\
 2) \quad 2 \\
 \hline
 11)15734 \\
 \hline
 40)1430 \text{ rem. } 4/2 \text{ or } 2 \text{ yd.} \\
 \text{_____} 8)35 \text{ rem. } 30 \text{ rd.} \\
 \hline
 4 \text{ rem. } 3 \text{ fur.}
 \end{array}$$

Ans. 4 mi. 4 fur. 30 rds 2 yd. 1ft.

(2.)In 21 mi. 6 fur 5 rd. 4 yd., how many feet?

(3.) 112864 feet, how many miles?

(4.) How many inches are there in the diameter of the earth, it being 7912 miles in diameter?



(5.) If the Atlantic cable were 2200 miles in length what would be the whole cost, at 10 cents a foot?

(6.) How many times will a wagon wheel turn round, in going a distance of 300 miles, supposing the wheel to be 10 feet 6 inches in circumference?

### SQUARE MEASURE.

95. A *square* is a figure having four equal sides and four equal corners.

96. Square measure is used in measuring surfaces.

#### *Table.*

144 square inches (sq. in.) make 1 square foot sq. ft.

9 square feet " 1 square yard sq. yd.

30 square yards " 1 square rod sq. rd.

40 square rods " 1 square rood R.

4 roods " 1 acre A.

Scale – ascending 144, 9 30  $\frac{1}{4}$ , 40, 4; descending 4, 40, 30  $\frac{1}{2}$ , 9, 144.

EXAMPLES FOR PRACTICE.

(1.) In 5 A. 2 R. 16 sq. rd. 12 sq. yd. 4 sq. ft. 120 sq. in. how many square inches?

5 A. 2 R. 16 sq. rd. 12 sq. yd. 4 sq. ft. 120 sq. in.

4

—  
22 R  
40

—  
896 sq rd.  
30 ¼

—  
26892  
224

—  
27116 sq. yd.  
9

—  
244048 sq. ft.  
144

—  
976312  
976192  
245048

—  
35143043 sq. in. Ans.

(2.) In 35143032 sq. in. how many acres?

144)35143043

—  
9)244048 rem. 120 sq. in.

—  
30 ¼)27116 rem. 4 sq. ft.  
4) 4

—  
121)108464 rem. 48/4 or 12 sq. yd.

—  
40)896  
: 2

—  
5 rem. 2 R.

Ans. 5 A. 2 R. 16 sq. rd 12 sq. yd. 4 sq. ft. 120 sq. in.

- (3.) Reduce 20 A. 3 R. 24 sq. rd. 6 sq. yd. 2 sq. ft. 50 sq. in., to square inches?  
 (4.) Reduce 39621082 sq. in. to acres.  
 (5.) How many acres in a field 200 rods long and 60 rods wide?  
 (6.) How many feet of plank in 20 planks, each 16 inches in breadth and 30 feet long?

MEASURES OF CAPACITY.

*I. Liquid Measure.*

97. *Liquid measure* is used in measuring liquids; such as liquors, molasses, &c.

*Table.*

4 gills (gi.)	make	1 pint	pt.
2 pints	"	1 quart	qt.
4 quarts	"	1 gallon	gal.
31 ½ gallons	"	1 barrel	bbl.
2 barrels, or 63 gal.	"	1 hogshead	hhd.

EXAMPLES FOR PRACTICE.

(1.) In 4 hhd. 1 bbl. 20 gal. 3 qt. 1 pt. 2 gi. how many gills?

$$\begin{array}{r}
 4 \text{ hhd. } 1 \text{ bbl. } 20 \text{ gal. } 3 \text{ qt. } 1 \text{ pt. } 2 \text{ gi.} \\
 2 \\
 \hline
 9 \text{ bbl.} \\
 31 \frac{1}{2} \\
 \hline
 303 \frac{1}{2} \text{ gal.} \\
 4 \\
 \hline
 1217 \text{ qt.} \\
 2 \\
 \hline
 2435 \text{ pt.} \\
 4 \\
 \hline
 9742 \text{ gi, Ans.}
 \end{array}$$

(2.) In 9742 gills, how many hogsheads?

$$\begin{array}{r} 4 \overline{)9742} \end{array}$$

$$\begin{array}{r} \overline{2)2435} \text{ pt. rem. 2 gi.} \end{array}$$

$$\begin{array}{r} \overline{4)1217} \text{ qt. rem. 1 pt.} \end{array}$$

$$\begin{array}{r} 31 \frac{1}{2} \overline{)304} \text{ gal. rem. 1 qt.} \end{array}$$

$$\begin{array}{r} 2) \quad 2 \end{array}$$

$$\begin{array}{r} \overline{63)608} \end{array}$$

$$\begin{array}{r} 2) \quad 9 \text{ bbl. rem. } 4 \frac{1}{2} \text{ equal to } 20 \frac{1}{2} \text{ gal.} \end{array}$$

$$\begin{array}{r} \overline{4} \text{ hhd.} \end{array}$$

Ans. 4 hhd. 20 ½ gal. 1 qt. 1 pt. 2 gi.

(3.) Reduce 5 hogsheads to gills.

(4.) Reduce 10080 gills to hogsheads.

(5.) in 10 hhd. 12 gal. 1 pt. how many pints?

(6.) What will be the cost of a hogshead of molasses, at 12 cents a gill?

(7.) At 8 cents a pint, how much molasses can be bought for \$40.32?

## *II. Dry Measure.*

98. *Dry Measure* is used in measuring grain, fruit, &c.

### *Table.*

2 pints (pt.) make 1 quart, qt.

8 quarts        "        1 peck, pk.

4 pecks        "        1 bushel, bu.

Scale - ascending 2, 8, 4; descending 4, 8, 2.

EXAMPLES FOR PRACTICE.

(1.) In 25 bu. 2 pk. 6 qt. 1 pt., how many pints?

$$\begin{array}{r}
 25 \text{ bu. } 2 \text{ pk. } 6 \text{ qt. } 1 \text{ pt.} \\
 4 \\
 \hline
 102 \text{ pk.} \\
 8 \\
 \hline
 822 \text{ qt.} \\
 2 \\
 \hline
 1645 \text{ pt. Ans.}
 \end{array}$$

(2.) In 1645 pints, how many bushels?

$$\begin{array}{r}
 2)1645 \\
 \hline
 8)822 \text{ qt. rem. } 1 \text{ pt.} \\
 \hline
 4)102 \text{ pk. rem. } 6 \text{ qt.} \\
 \hline
 25 \text{ bu. rem. } 2 \text{ pk.} \\
 \text{Ans. } 25 \text{ bu. } 2 \text{ pk. } 6 \text{ qt. } 1 \text{ pt.}
 \end{array}$$

(3.) Reduce 2 bu. 1 pk. 1 qt. 1 pt. to pints.

(4.) Reduce 147 pints to bushels.

(5.) A merchant bought 30 bushels of pindars at \$1.50 per bushel, and retailed them at 5 cents a pint; how much did he make by the operation.

TIME.

99. *Time* is used in measuring periods of duration, as years, days, months, &c.

*Table.*

60 seconds (sec.) make 1 minute min.

60 minutes " 1 hour h.

24 hours " 1 day da.

7 days " 1 week wk.

365 days " 1 common year yr.

366 days " 1 leap year yr.

12 months " 1 year yr.

100 years " 1 century C.

Scale – ascending 60, 60, 24, 7; descending 7, 24, 60, 60.

NOTE 1. – Leap years are divisible by 4 without a remainder. The number of days in each month may be remembered by the following lines:

“Thirty days hath September,  
April, June and November;  
All the rest have thirty-one  
Except February, which alone  
Hath twenty-eight; and one day more  
We add to it one year in four.”

2. In most transactions 3 days are regarded as 1 month.

EXAMPLES FOR PRACTICE.

(1.) In 1 yr. 6 m. 2 wk. 4 da. 16 h. 30 min. 10 sec.; how many seconds?

1 yr. 6 m. 2 wk. 4 da. 16 h. 30 min. 10 sec.  
12

—  
18 m.  
4

—  
74 wk.  
7

—  
522 da.  
24

—  
2104  
1044

—  
12544 h.  
60

—  
752607 min.  
60

—  
45160210 sec. Ans.

(2.) In 45160210 sec.; how many years?

$$\begin{array}{r} 60)45160210 \\ \hline \end{array}$$

$$\begin{array}{r} 60)752670 \text{ min. rem. } 10 \text{ sec.} \\ \hline \end{array}$$

$$\begin{array}{r} 24)12544 \text{ h. rem. } 30 \text{ min.} \\ \hline \end{array}$$

$$\begin{array}{r} 7)522 \text{ da. rem. } 16 \text{ h.} \\ \hline \end{array}$$

$$\begin{array}{r} 4)74 \text{ wk. rem. } 4 \text{ da.} \\ \hline \end{array}$$

$$\begin{array}{r} 12)18 \text{ m. rem. } 2 \text{ wk.} \\ \hline \end{array}$$

$$\begin{array}{r} 1 \text{ yr. rem. } 6 \text{ m.} \\ \hline \end{array}$$

Ans. 1 yr. 6 m. 2 wk. 4 da. 16 h. 30 min. 10 sec.

(3.) in 365 day. 5 h. 48 min. 46 sec.; how many seconds?

(4.) In 31556926 seconds how many days?

(5.) How much will a person lose in 10 years by idling away 10 minutes every day?

#### COUNTING.

100 In counting,

12 units or things make 1 dozen.

12 dozen " 1 gross.

101 Paper.

24 sheets make 1 quire.

20 quires " 1 ream.

(1.) How many gross are there in 260 thousand steel pens?

(2.) In 10000 sheets of paper, how many quires?

### Promiscuous Examples.

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1. If a man buy 2 T. 18 cwt. 20 lb of hay, at 3 ½ cents a pound; what did it cost?
2. If a man walking, step 3 feet at a step, how many times will he step in traveling 75 miles?
3. What is the value of a town lot, 4 rods wide and 6 rods long, if every square inch is worth 2 cents?
4. What will be the cost of 5 hogsheads of molasses at 10 cents a quart?
5. Bought 1284 quarts of corn at \$2.56 per bushel, what did the corn cost me?
6. How many years old is the person who has lived 9892600 seconds?
7. How many buttons did the merchant purchase who bought 15 gross?
8. At 10 dollars a quire, what will 200 reams of paper cost?

### QUESTIONS.

91. What is a compound number?
92. In what does reduction consist?
93. What is weight? What is the weight called in common use? Repeat the table.
94. For what purpose is long measure used? Repeat table.
95. What is a square?
96. The use of square measure? Repeat the table of square measure?
97. For what is liquid measure used? Repeat the table.
98. What is dry measure used for? Repeat the table.
99. For what is time used? Repeat the table. How can you tell what year is leap year? How many you remember the number of days in a month? How many days are generally regarded as a month? How many weeks are usually considered a month?



100. Repeat the table for counting?  
 101. For recounting paper?

ADDITION.

102. (1.) What is the sum of 15 T. 12 cwt. 25 lb. 9 oz., 20 T. 8 cwt 56 lb. 14 oz., and 30 lb 0 ox. 9 dr.

T	cwt.	lb.	oz.	dr.
15	12	25	9	0
20	8	56	14	0
		30	0	9

Ans. 36 1 12 7 9

Place units of the same kind under each other. The sum of the column of drams is 9. The sum of the ounces is 23; equal to 1 lb. 7 oz. We write the 7 oz. and add the 1 lb. to the column of pounds. The sum of the pounds is 112; equal to 1 cwt. 12 lbs. We write the 12 lbs. and add 1 cwt. to the column of hundred weights. We next add the column of hundred weights making 21 cwt. equal to 1 ton and 1 cwt. We write the 1 cwt. and add the 1 T. to the column of T. Adding the last column, we have the amount 36 T.

*RULE. Write the numbers so that those of the same kind, will stand in the same column. Begin at the right hand, and add as in simple numbers, and divide the sum by that number which is required of this denomination to make 1 of the next higher; write the remainder under the column added, and add the quotient to the next column. Proceed this with every denomination.*

(2)

bu.	pk.	qt.	pt.
15	2	6	
140	0	3	
226	3	7	1
350	1	5	1
<hr/>			
733	0	6	0

(3)

hhd.	gal.	qt.	pt.
13	40	2	1
584	15	3	0
6	10	1	0
75	13	2	1
<hr/>			
679	17	1	0

(4)

m.	fur.	rd.
10	0	36
48	6	12
0	0	38
16	3	20
<hr/>		
75	3	26

(5.) How many acres are 24 A. 2 R. 30 rd., 26 A. 0 R. 11 rd., 162 A. 2 R., and 76 A. 2 R. 25 rd.?

(6.) Ad together 1 yr. 100 da. 15 h. 0 min. 4 sec., 15 yr. 165 da. 4 h. 3 min. 45 sec., and 150 da. 0 h. 19 min. 14 sec.

(7.) How many yards are 35 yd. 1 ft. 11 in., 24 yd. 0 ft. 6 in, 1 ft. 2 in., and 40 yd. 4 ft. 3 in.?

### SUBTRACTION.

108. (1.) From 12 T. 8 cwt. 16 lb. take 10 T. 9 cwt. 30 lb.

T	cwt.	lb.
12	8	16
10	9	30

Ans.  $\begin{array}{r} \hline 1\ 18\ 86 \end{array}$

To subtract 30 pounds we add 1 cwt. to 16, making 116 lb. and take 30 from 116. Now having added 1 cwt. to the minuend, we must add 1 cwt. to the subtrahend 9, making 10 cwt. We can not take 10 from 8, so we add 1 T. or 20 cwt. to 8 cwt. and subtract 10. Having added 1 T. or 20 cwt. to the minuend, we now increase the subtrahend by the same sum, 1 T., making 11 tons and subtract. Hence the following *RULE. Write the subtrahend under the minuend, so that the same denomination shall stand under one another. Subtract as in simple numbers. If the number of any denomination is the subtrahend exceed that in the minuend, increase the minuend by as many as make 1 of the next higher denomination, and consider the number of the next higher denomination in the subtrahend to be 1 greater than it stands.*

	(2.)				(3.)				(4.)			
	bu.	pk.	qt.	pt.	hhd.	gal.	qt.	pt.	A.	R.	rd.	yd.
From	40	3	1	1	1	0	0	0	94	3	20	5
Take	20	3	3	0		8	3	1	13	2	32	4
Rem.	$\begin{array}{r} \hline 19\ 3\ 6\ 1 \end{array}$				$\begin{array}{r} \hline 54\ 0\ 1 \end{array}$				$\begin{array}{r} \hline 31\ 0\ 28\ 1 \end{array}$			

- (5.) Subtract 2 yr. 35 da. 6 h. 40 min. from 6 yr. 20 da. 10 h.  
 (6.) From 20 m. 1 fur. 8 rd. subtract 16 m. 5 fur.  
 (7.) A farmer having 150 bu. 3 pk. 6 qt. of corn, sold 40 bu. 2 pk. 0 qt. 1 pt; how many bushels had he left?

MULTIPLICATION.

104. (1.) Multiply 4 T. 6 cwt. 50 lb. 14 oz. by 8.

$$\begin{array}{r}
 \text{T cwt. lb. oz.} \\
 4 \quad 6 \quad 50 \quad 14 \\
 \phantom{4 \quad 6 \quad 50} \quad 8 \\
 \hline
 \end{array}$$

Ans.  $\overline{34 \quad 12 \quad 7 \quad 0}$

Write the multiplier under the lowest term of the multiplicand and proceed; 8 times 14 oz. are 112 oz. equal to 7 lb. 0 oz.; we write the 0 oz. under the number multiplied. And again 8 times 50 lb. is 400 lb. and 7 lb. added make 407 lb., equal to 4 cwt. and 7 lb.; we write the 7 under the number multiplied. Again, 8 times 6 cwt. are 48 cwt. and 4 cwt. added make 52 cwt. equal to 2 T. and 12 cwt. Again, multiply 4 T. by 8, add 2 T. and the sum will be the answer. Hence,

*RULE. Write the multiplier under the lowest denomination of the multiplicand. Multiply as in simple numbers, and carry as in addition of compound numbers.*

<p>(2.)</p> $  \begin{array}{r}  \text{mi. fur. rd. yd. ft.} \\  10 \quad 6 \quad 30 \quad 4 \quad 2 \\  \phantom{10 \quad 6 \quad 30} \quad 5 \\  \hline  54 \quad 1 \quad 34 \quad 1 \quad 1  \end{array}  $	<p>(3.)</p> $  \begin{array}{r}  \text{bu. pk. qt. pt.} \\  4 \quad 2 \quad 5 \quad 1 \\  \phantom{4 \quad 2 \quad 5} \quad 2 \\  \hline  9 \quad 1 \quad 3 \quad 0  \end{array}  $	<p>(4.)</p> $  \begin{array}{r}  \text{A. R. rd. sq. yd.} \\  4 \quad 3 \quad 20 \quad 10 \\  \phantom{4 \quad 3 \quad 20} \quad 14 \\  \hline  68 \quad 1 \quad 4 \quad 19  \end{array}  $
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- (5.) Multiply 5 yr. 160 da. 12 h. 40 min. by 9.  
 (6.) If 1 acre of land produce 25 bu. 2 pk. 5 qt. 1 pt. of corn, how much will 16 acres produce?  
 (7.) What is the weight of 24 loads of hay, each weighing 2 T. 6 cwt. 50 lb.

(5.) How many acres are 24 A. 2 R. 30 rd. 26 A. 0 R. 11 rd., 162 A. 2 R., and 76 A. 2 R. 25 rd?

(6.) Add together 1 yr. 100 da. 15 h. 0 min. 4 sec. 15 yr. 165 da. 4 h. 3 min. 45 sec., and 150 da. 0 h. 19 min. 14 sec.

(7.) How many yards are 35 yd. 1 ft. 11 in., 24 yd. 0 ft. 6 in. 1 ft. 2 in., and 40 yd. 4 ft. 3 in.?

### SUBTRACTION.

103. (1.) From 12 T. 8 cwt. 16 lb. take 10 T. 9 cwt. 30 lb.

T.	cwt.	lb.
12	8	16
10	9	30

Ans. 1 18 86

To subtract 30 pounds we add 1 cwt. to 16, making 116 lb. and take 30 from 116. Now having added 1 cwt. to the minuend, we must add 1 cwt. to the subtrahend 9, making 10 cwt. We can not take 10 from 8, so we add 1 T. or 20 cwt. to the minuend, we now increase the subtrahend by the same sum, 1 T. , making 11 tons, and subtract. Hence the following

*RULE. Write the subtrahend under the minuend, so that the same denomination shall stand under one another. Subtract as in simple numbers. If the number of any denomination is the subtrahend exceed that in the minuend, increase the minuend by as many as make 1 of the next higher denomination, and consider the number of the next higher denomination in the subtrahend to be 1 greater than it stands.*

	(2.)				(3.)				(4.)			
	bu.	pk.	qt.	pt.	hhd.	gal.	qt.	pt.	A.	R.	rd.	yd.
From	40	3	1	1	1	0	0	0	94	3	20	5
Take	20	3	3	0		8	3	1	13	2	32	4
Rem.	<hr style="width: 100%;"/>				<hr style="width: 100%;"/>				<hr style="width: 100%;"/>			
	19	3	6	1	54	0	1		31	0	28	1

- (5.) Subtract 2 yr. 35 da. 6 h. 40 min. from 6 yr. 20 da. 10 h.  
 (6.) From 20 m. 1 fur. 8 rd. subtract 16 m. 5 fur.  
 (7.) A farmer having 150 bu. 3 pk. 6 qt. of corn, sold 40 bu. 2 pk. 0 qt. 1 pt; how many bushels had he left?

MULTIPLICATION.

104. (1.) Multiply 4 T. 6 cwt. 50 lb. 14 oz. by 8.

$$\begin{array}{r}
 \text{T cwt. lb. oz.} \\
 4 \quad 6 \quad 50 \quad 14 \\
 \phantom{4 \quad 6 \quad 50 \quad 14} 8 \\
 \hline
 \end{array}$$

Ans.  $\overline{34 \quad 12 \quad 7 \quad 0}$

Write the multiplier under the lowest term of the multiplicand and proceed; 8 times 14 oz. are 112 oz. equal to 7 lb. 0 oz.; we write the 0 oz. under the number multiplied. And again 8 times 50 lb. is 400 lb. and 7 lb. added make 7 407 lb., equal to 4 cwt. and 7 lb.; we write the 7 under the number multiplied. Again, 8 times 6 cwt. are 48 cwt. and 4 cwt. added make 52 cwt. equal to 2 T. and 12 cwt. Again, multiply 4 T. by 8, add 2 T. and the sum will be the answer. Hence,

*RULE. Write the multiplier under the lowest denomination of the multiplicand. Multiply as in simple numbers, and carry as in addition of compound numbers.*

<p>(2.)</p> $  \begin{array}{r}  \text{mi. fur. rd. yd. ft.} \\  10 \quad 6 \quad 30 \quad 4 \quad 2 \\  \phantom{10 \quad 6 \quad 30 \quad 4 \quad 2} 5 \\  \hline  54 \quad 1 \quad 34 \quad 1 \quad 1  \end{array}  $	<p>(3.)</p> $  \begin{array}{r}  \text{bu. pk. qt. pt.} \\  4 \quad 2 \quad 5 \quad 1 \\  \phantom{4 \quad 2 \quad 5 \quad 1} 2 \\  \hline  9 \quad 1 \quad 3 \quad 0  \end{array}  $	<p>(4.)</p> $  \begin{array}{r}  \text{A. R. rd. sq. yd.} \\  4 \quad 3 \quad 20 \quad 10 \\  \phantom{4 \quad 3 \quad 20 \quad 10} 14 \\  \hline  68 \quad 1 \quad 4 \quad 19  \end{array}  $
--	---	--

- (5.) Multiply 5 yr. 160 da. 12 h. 40 min. by 9.  
 (6.) If 1 acre of land produce 25 bu. 2 pk. 5 qt. 1 pt. of corn, how much will 16 acres produce?  
 (7.) What is the weight of 24 loads of hay, each weighing 2 T. 6 cwt. 50 lb.

105. (1.) Divide 205 bu. 2 pk. 4 qt. by 8.

bu.	pk.	qt.	pt.
8)205	2	4	
25	2	6	1

Writing the divisor on the left of the dividend, we divide 205 bu. by 8, and obtain a quotient of 25 bu. and a remainder of 5 bu. We write the 25 bu. and a remainder of 5 bu. We write the 25 and reduce the 5 bu. to pecks, making 20 pk. and the g-pk. of the dividend added make 22 pk. Dividin 22 pk. by 8, we obtain a quotient of 2 pk and a remainder of 6 pk.; writing the 2 pk. and reducing 6 pk. to quarts, and adding the 4 qt. we have 52 qt., which divided by 8 gives 6 qt. and a remainder of 4 qt. Reducing the 4 qt. to pt. we have 8 pt., which divided by 8 gives 1 pint, and the work is done.

If the divisor is large, we may work as follows:

(2.) Divide 264 bu. 2 pk. by 92.

bu.	pk.
92)264	2)2 bu.
184	
80	
4	
322(3 pk.	
276	
46	
8	
368(4 qt.	
368	

Ans. 2 bu. 3 pk. 4 qt.

*RULE. Divide each denomination separately beginning with the highest. If a remainder occur, reduce it to the next lower denomination, adding in the given number of that denomination, if any, and divide as before.*

(3.)	(4.)	(5.)
T. cwt. lb. oz.	wk. da. h. min.	mi. fur. rd. yd. ft. in.
7)45 15 25 14	8)7 4 20 0	9)27 6 30 4
6 10 75 2	6 17 30	3 0 30 0 1 4

(6.) If 4 persons inherit 22 A. 2 R. 12 rd. of land, and it be divided equally between them, how much will there be in each lot?

(7.) If a man travel by railroad 1200 miles in one day, what was the rate per hour?

(8.) If 120 hogsheads of sugar weigh 50 T. 18 cwt. 40 lb. 12 oz. what is the average weight per hogshead?

#### PROMISCUOUS EXAMPLES.

1. Find the sum of 36 A. 2 R. 25. sq. rd. 15 sq. yd. 5 sq. ft. 115 sq. in., 20 A. 3 R. 37 sq. rd. 20 sq. yd 8 sq. ft. 95 sq. in., and 256 A. 2 R. 6 sq. rd. 24 sq. yd. 8 sq. ft. 75 sq. in.
2. A man who had 23 T. of hay, sold 10 T. 16 cwt. 95 lb., how much had he left?
3. From 1776 yr. 7 m. 4 da., subtract 1492 yr. 10 m. 14 day.
4. Dr. Franklin was born Jan. 18, 1706, and Gen. Washington Feb 22, 1732; how much older was Franklin than Washington?
5. If a man travel 25 mi. 7 fur. 20 rd. 14 ft. 3 in. in 1 day, how far will he travel in 10 days?
6. Divide 5 hogsheads of sugar between 9 persons, giving each an equal share?
7. How many steps, of 27 inches each, must a person take in walking 50 miles?
8. If you divide 100 bu. of corn among 7 poor families, how many bushels will each family receive?
9. How old are you at this time, May 4, 1864?

105. (1.) Divide 205 bu. 2 pk. 4 qt. by 8.

bu.	pk.	qt.	pt.
8)205	2	4	
25	2	6	1

Writing the divisor on the left of the dividend, we divide 205 bu. by 8, and obtain a quotient of 25 bu. and a remainder of 5 bu. We write the 25 bu. and a remainder of 5 bu. We write the 25 and reduce the 5 bu. to pecks, making 20 pk. and the g-pk. of the dividend added make 22 pk. Dividin 2 22 pk. by 8, we obtain a quotient of 2 pk and a remainder of 6 pk.; writing the 2 pk. and reducing 6 pk. to quarts, and adding the 4 qt. we have 52 qt., which divided by 8 gives 6 qt. and a remainder of 4 qt. Reducing the 4 qt. to pt. we have 8 pt., which divided by 8 gives 1 pint, and the work is done.

If the divisor is large, we may work as follows:

(2.) Divide 264 bu. 2 pk. by 92.

bu.	pk.
92)264	2)2 bu.
184	
80	
4	
322(3 pk.	
276	
46	
8	
368(4 qt.	
368	

Ans. 2 bu. 3 pk. 4 qt.

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(3.)	(4.)	(5.)
T. cwt. lb. oz.	wk. da. h. min.	mi. fur. rd. yd. ft. in.
7)45 15 25 14	8)7 4 20 0	9)27 6 30 4
6 10 75 2	6 17 30	3 0 30 0 1 4

(6.) If 4 persons inherit 22 A. 2 R. 12 rd. of land, and it be divided equally between them, how much will there be in each lot?

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(8.) If 120 hogsheads of sugar weigh 50 T. 18 cwt. 40 lb. 12 oz. what is the average weight per hogshead?

#### PROMISCUOUS EXAMPLES.

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3. From 1776 yr. 7 m. 4 da., subtract 1492 yr. 10 m. 14 day.
4. Dr. Franklin was born Jan. 18, 1706, and Gen. Washington Feb 22, 1732; how much older was Franklin than Washington?
5. If a man travel 25 mi. 7 fur. 20 rd. 14 ft. 3 in. in 1 day, how far will he travel in 10 days?
6. Divide 5 hogsheads of sugar between 9 persons, giving each an equal share?
7. How many steps, of 27 inches each, must a person take in walking 50 miles?
8. If you divide 100 bu. of corn among 7 poor families, how many bushels will each family receive?
9. How old are you at this time, May 4, 1864?

146. *Analysis* consists solving problems without set rules, by investigating the relations of the given numbers, and giving the reasons of the several steps of the operations according to the conditions of the question.

#### RELATIONS OF NUMBERS.

1. What part of 2 is 1? Ans.  $\frac{1}{2}$ .
2. What part of 4 is 2?
3. What part of 9 is 3?
4. What part of 20 is 5?
5. What part of 50 is 10?
6. What part of 12 is 8?
7. What part of 25 is 10?
8. What part of 7 is (illegible)?
9. What part of 9 is 4?
10. What part of 4 is 12?
11. What part of 4 is 20?
12. What part of 8 is 9?
13. What part of  $\frac{2}{8}$  is  $\frac{1}{4}$ ? Ans. (illegible)
14. What part of  $\frac{2}{3}$  is  $\frac{1}{3}$ ?
15. What part of  $\frac{5}{6}$  is  $\frac{2}{5}$ ?
16. What part of  $2\frac{1}{2}$  is 1? Ans. (illegible)
17. What part of 9 is  $4\frac{2}{3}$ ?
18. What part of  $3\frac{1}{2}$  is  $2\frac{1}{2}$ ?
19. What part of  $1\frac{1}{2}$  is (illegible)  $\frac{2}{5}$ ?

#### EXAMPLES FOR PRACTICE.

1. If 2 men do a piece of work in 10 days, how long will it take 1 man to do the same work?
2. If 3 men make 900 rails in a week, how many rails will 1 man make in the same time?
3. If 24 cords of wood cost 480 dollars, how much will 1 cord cost?

4. If 1 pound of sugar be worth \$1.25, what will 30 pounds come to at the same rate?
5. If \$3  $\frac{1}{2}$  will purchase 1 yard of cloth, how many yards can be bought for \$49?
6. If 1 man do a piece of work in 16 days, how long will it take 2 men to do the same amount of work?
7. If 1 man, by working 9 hours a day, can do a piece of work in 4 days, how many days will it take him if he work 1 hour a day?
8. If 6 bushels of corn cost \$12, how much will 15 bushels cost?  
If 6 bushels cost \$12, 1 bushel will cost one sixth of \$12, equal to \$2; if 1 bushel cost \$2, 15 bushels will cost 15 times \$2, equal to \$30.
9. If 12 horses consume 72 bushels of oats in 1 month, how many bushels will 30 horses consume in the same time?
10. If 36 tons of hay cost \$6840, what will 10 tons cost at the same rate?
11. If a man can build 768 rods of fence in 60 days, how many rods can he build in 45 days?
12. If 32 soldiers eat 896 pounds of beef in a week, how many pounds will 175 soldiers eat in a week?
13. If the wages of 3 men for 28 days be \$252, what will be the wages of 9 men for 22 days?  
If the wages of 3 men for 28 days be \$252, the wages of 1 man for 28 days will be one third of \$252, equal to \$84, and the wages of one man for one day will be one twenty-eighth of \$84, equal to \$3; if the wages of one man for one day be \$3 9 men for 1 day will be 9 times \$3, equal to \$27, and in 22 days their wages will be 22 times their wages for 1 day; 22 times \$27 equal \$594. Ans. \$594
14. If \$31  $\frac{1}{2}$  will buy 14 cords of wood, how many cords can be bought for \$94  $\frac{1}{4}$ ?
15. If a staff 3 ft. long cast a shadow 10 ft. in length, what is the height of an object that casts a shadow 139  $\frac{1}{3}$  feet, at the same time of day?
16. How many yards of cloth  $\frac{2}{3}$  of a yard wide are equal to 112 yards  $\frac{3}{4}$  of a yard wide?

146. *Analysis* consists solving problems without set rules, by investigating the relations of the given numbers, and giving the reasons of the several steps of the operations according to the conditions of the question.

#### RELATIONS OF NUMBERS.

1. What part of 2 is 1? Ans.  $\frac{1}{2}$ .
2. What part of 4 is 2?
3. What part of 9 is 3?
4. What part of 20 is 5?
5. What part of 50 is 10?
6. What part of 12 is 8?
7. What part of 25 is 10?
8. What part of 7 is (illegible)?
9. What part of 9 is 4?
10. What part of 4 is 12?
11. What part of 4 is 20?
12. What part of 8 is 9?
13. What part of  $\frac{2}{8}$  is  $\frac{1}{4}$ ? Ans. (illegible)
14. What part of  $\frac{2}{3}$  is  $\frac{1}{3}$ ?
15. What part of  $\frac{5}{6}$  is  $\frac{2}{5}$ ?
16. What part of  $2\frac{1}{2}$  is 1? Ans. (illegible)
17. What part of 9 is  $4\frac{2}{3}$ ?
18. What part of  $3\frac{1}{2}$  is  $2\frac{1}{2}$ ?
19. What part of  $1\frac{1}{2}$  is (illegible)  $\frac{2}{5}$ ?

#### EXAMPLES FOR PRACTICE.

1. If 2 men do a piece of work in 10 days, how long will it take 1 man to do the same work?
2. If 3 men make 900 rails in a week, how many rails will 1 man make in the same time?
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7. If 1 man, by working 9 hours a day, can do a piece of work in 4 days, how many days will it take him if he work 1 hour a day?
8. If 6 bushels of corn cost \$12, how much will 15 bushels cost?  
If 6 bushels cost \$12, 1 bushel will cost one sixth of \$12, equal to \$2; if 1 bushel cost \$2, 15 bushels will cost 15 times \$2, equal to \$30.
9. If 12 horses consume 72 bushels of oats in 1 month, how many bushels will 30 horses consume in the same time?
10. If 36 tons of hay cost \$6840, what will 10 tons cost at the same rate?
11. If a man can build 768 rods of fence in 60 days, how many rods can he build in 45 days?
12. If 32 soldiers eat 896 pounds of beef in a week, how many pounds will 175 soldiers eat in a week?
13. If the wages of 3 men for 28 days be \$252, what will be the wages of 9 men for 22 days?  
If the wages of 3 men for 28 days be \$252, the wages of 1 man for 28 days will be one third of \$252, equal to \$84, and the wages of one man for one day will be one twenty-eighth of \$84, equal to \$3; if the wages of one man for one day be \$3 9 men for 1 day will be 9 times \$3, equal to \$27, and in 22 days their wages will be 22 times their wages for 1 day; 22 times \$27 equal \$594. Ans. \$594
14. If \$31  $\frac{1}{2}$  will buy 14 cords of wood, how many cords can be bought for \$94  $\frac{1}{4}$ ?
15. If a staff 3 ft. long cast a shadow 10 ft. in length, what is the height of an object that casts a shadow 139  $\frac{1}{3}$  feet, at the same time of day?
16. How many yards of cloth  $\frac{2}{3}$  of a yard wide are equal to 112 yards  $\frac{3}{4}$  of a yard wide?

17. If 12 men can cut 135 cords of wood in 6 days, how many cords can 16 men cut in 27 days?

PROMISCUOUS EXAMPLES.

1. A person bought 30 bushels of apples at  $2\frac{1}{2}$  dollars a bushel. Having sold 12 bushels of them at  $2\frac{2}{3}$  dollars a bushel, at what price per bushel must he sell the remainder, to gain  $6\frac{3}{4}$  dollars on the whole? Ans.  $\$2\frac{55}{72}$

2. How many barrels of beef at  $12\frac{1}{2}$  dollars a barrel may be purchased for  $1137\frac{1}{2}$  dollars?

3. A planter sold 150 bales of cotton, at 46 dollars per bale. He then bought a horse for 200 dollars, a carriage for 350 dollars, and groceries to the amount of 1125 dollars; what sum had he left?

4. If 512 be multiplied by 50, the product diminished by 1250 and the remainder divided by 70, what will be the quotient? Ans.  $347\frac{6}{7}$ .

5. Two men start from different places, 1250 miles apart, and travel toward each other; one goes 4 miles, and the other 6 miles an hour; in how many hours will they meet? Ans. 125 hours.

6. What number divided by  $2\frac{7}{8}$  will give a quotient of  $3\frac{3}{4}$ ? Ans.  $10\frac{25}{32}$ .

7. A and B can do a piece of work in 44 days: A can do  $\frac{3}{8}$  as much as B; in how many days can each do it? Ans. A, 12 days; B, 32 days.

8. A man lost  $\frac{1}{2}$  his money, and then found 30 dollars, when he had just  $\frac{4}{5}$  of his original amount; how much had he at first? Ans. 100 dollars.

9. A post stands  $\frac{1}{8}$  in the mud,  $\frac{2}{5}$  under the water, and 44 feet above the water; what is its length? Ans. 165 feet.

10. If 50 acres of land cost \$1423.75, what will 1 acre cost? Ans. \$23.475.

11. Add  $\frac{2}{3}$  of a bushel,  $\frac{1}{2}$  of a peck and  $\frac{1}{4}$  of a quart together.
12. What is the amount of \$1500 for 3 months at 8 per cent.?
13. What is the interest of \$100 from March 4, 1869 to May 4, 1864, at  $5\frac{1}{2}$  per cent.?
14. How much is the interest on a note of \$288.75 for 2 y. 5 m. 21 da. at 7 per cent.
15. What is the amount of 19 cents for 11 days at 8 per cent.?
16. If 1000 pounds of sugar cost \$250, how must it be sold per pound to gain 30 per cent.?
17. If a man do a piece of work in 4 days, and a boy do it in 5 days, in what time ought the two together to do the work? Ans.  $2\frac{2}{9}$  days.
18. If 3 men can earn \$1260 in 6 weeks, how long will it take 5 men to earn \$2800?
19. A can reap 1 acre of wheat in 4 hours, and B can reap 1 acre in 6 hours, in what time can they both together reap 10 acres? Ans. 24 hours.

17. If 12 men can cut 135 cords of wood in 6 days, how many cords can 16 men cut in 27 days?

PROMISCUOUS EXAMPLES.

1. A person bought 30 bushels of apples at  $2\frac{1}{2}$  dollars a bushel. Having sold 12 bushels of them at  $2\frac{2}{3}$  dollars a bushel, at what price per bushel must he sell the remainder, to gain  $6\frac{3}{4}$  dollars on the whole? Ans.  $\$2\frac{55}{72}$

2. How many barrels of beef at  $12\frac{1}{2}$  dollars a barrel may be purchased for  $1137\frac{1}{2}$  dollars?

3. A planter sold 150 bales of cotton, at 46 dollars per bale. He then bought a horse for 200 dollars, a carriage for 350 dollars, and groceries to the amount of 1125 dollars; what sum had he left?

4. If 512 be multiplied by 50, the product diminished by 1250 and the remainder divided by 70, what will be the quotient? Ans.  $347\frac{6}{7}$ .

5. Two men start from different places, 1250 miles apart, and travel toward each other; one goes 4 miles, and the other 6 miles an hour; in how many hours will they meet? Ans. 125 hours.

6. What number divided by  $2\frac{7}{8}$  will give a quotient of  $3\frac{3}{4}$ ? Ans.  $10\frac{25}{32}$ .

7. A and B can do a piece of work in 44 days: A can do  $\frac{3}{8}$  as much as B; in how many days can each do it? Ans. A, 12 days; B, 32 days.

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9. A post stands  $\frac{1}{8}$  in the mud,  $\frac{2}{5}$  under the water, and 44 feet above the water; what is its length? Ans. 165 feet.

10. If 50 acres of land cost \$1423.75, what will 1 acre cost? Ans. \$23.475.



11. Add  $\frac{2}{3}$  of a bushel,  $\frac{1}{2}$  of a peck and  $\frac{1}{4}$  of a quart together.
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