

## Reduction Ascending.

1. Reduce 1392 inches to rods.

## Rule.

I. Divide the given number by the units of the scale which connect it with the denomination next higher, and set aside the remainder, if any:

$$\begin{array}{r} \text{OPERATION.} \\ 12 \overline{) 1392} \\ \underline{3} \phantom{00} \\ 3 \overline{) 116} \text{ ft.} \\ \underline{5\frac{1}{2}} \phantom{0} \\ 11 \overline{) 76} \\ \underline{6} \phantom{0} \end{array}$$

6..5 yd.

II. Divide the quotient by the units of the scale which connect it with the next higher denomination, and so on till the required denomination is reached. The last quotient, with the several remainders annexed, will be the answer.

Ans. 6 rd. 5 yd. 2 ft.

## Examples.

1. In 15204 seconds, how many degrees?

$$\begin{array}{r} \text{OPERATION.} \\ 60 \overline{) 15204} \\ \underline{60} \phantom{00} \\ 60 \overline{) 25} \underline{3} \dots 24'' \\ \underline{4} \phantom{00} \end{array}$$

Ans. 4° 13' 24''.

2. In 37469 pints, how many bushels?

$$\begin{array}{r} \text{OPERATION.} \\ 2 \overline{) 37469} \\ \underline{2} \phantom{00} \\ 8 \overline{) 18734} \dots 1 \text{ pt.} \\ \underline{4} \phantom{00} \\ 4 \overline{) 2341} \dots 6 \text{ qt.} \\ \underline{5} \phantom{00} \end{array}$$

585..1 pk.

Ans. 585 bu. 1 pk. 6 qt. 1 pt.

## Proof.

134. The proof of Reduction, either Ascending or Descending, is made by reversing the operation.

1. In 12 cu. yd. 15 cu. ft. 12 cu. in., how many cubic inches?  
2. In 585804 cu. in., how many cubic yards, &c.?

$$\begin{array}{r} \text{OPERATION.} \\ \text{cu. yd.} \quad \text{cu. ft.} \quad \text{cu. in.} \\ 12 \quad 15 \quad 12 \\ \underline{27} \\ 99 \\ \underline{24} \\ 339 \text{ cu. ft.} \\ \text{cu. in.} \\ 339 \times 1728 + 12 = 585804 \end{array}$$

$$\begin{array}{r} \text{OPERATION.} \\ 1728 \overline{) 585804} \text{ cu. in.} \\ \underline{27} \phantom{00} \\ 27 \overline{) 339} \dots 12 \text{ cu. in.} \\ \underline{12} \phantom{00} \end{array}$$

12..15 cu. ft.

Ans. 12 cu. yd. 15 cu. ft. 12 cu. in.

## Examples.

- How many pounds are there in 8445 pence?
- How many shillings are there in 49742 farthings?
- In 87049 inches, how many rods?
- In 4704609 feet, how many miles?
- How many yards are there in 87408 inches?
- Reduce 690492 square inches to square rods.
- Reduce 870496 square feet to acres.
- Reduce 588967 perches to square miles.
- Reduce 57409 square feet to square chains.
- In 678569 cubic inches, how many cubic yards?
- In 87496 cord feet, how many cords?
- In 4521624 cubic inches, how many tons of hewn timber?
- In 78757 pints, how many barrels?
- In 874904 quarts, how many pipes?
- Reduce 6874049 quarts to tuns.
- In 387049 pints, how many bushels?
- In 886604 quarts, how many bushels?
- In 72411 bushels, how many chaldrons?
- In 27416 drams, how many quarters?

20. In 47409 ounces, how many hundredweight?
21. Reduce 875604 ounces to tons.
22. Change 4704967109 pounds to tons.
23. In 41049 grains, Troy, how many ounces?
24. Reduce 94099 pennyweights to pounds.
25. Reduce 610476 grains, Apothecaries' weight, to lbs.
26. Reduce 45046 scruples, Apothecaries', to pounds.
27. Change 84049 drams, Apothecaries', to pounds.
28. Change 589405 grains, Apothecaries', to pounds.
29. How many hours are there in 654604 seconds?
30. How many days are there in 869504 minutes?
31. Change 3870469 seconds to months of 30 days.
32. Reduce 6549047 minutes to common years.
33. How many leap years in 8704926 hours?
34. How many common years in 974605 minutes?
35. How many months, of 31 days each, in 87049 minutes?
36. How many degrees in 870493 seconds?
37. How many hour angles in 764904 minutes?
38. How many signs in 270493 minutes?
39. How many circumferences in 429072 minutes?
40. How many degrees are there in 99804 seconds?
41. How many circumferences in 80493063 seconds?

**Miscellaneous Examples.**

1. Reduce 7 fur. 39 rd. 4 yd. 1 ft. 11 in. to inches.
2. In 74 wk. 6 da. 15 hr., how many seconds are there?
3. In 11 s.  $14^{\circ} 49''$ , how many seconds are there?
4. In a box of sugar, weighing 15 cwt. 1 qr. 16 lb., how many ounces are there?
5. If a person has walked 24 miles, how many inches has he walked?

6. What will be the cost of 37 cwt. 2 qr. 20 lb. of sugar, at  $7\frac{1}{2}$  cts. per lb.?
7. A grocer has 16 cwt. 1 qr. 13 lb. of sugar, and wishes to put it into bags, each containing 7 lb.: how many bags will he require?
8. In 3 yr. 161 da. 13 hr., how many minutes are there?
9. In 19 wk. 4 da., how many half-hours are there?
10. How many weeks has a man labored, who has not worked on Sundays, and been employed 4964 hours?
11. How many minutes has a man lived, whose age is 47 years, supposing 11 of them to have been leap years?
12. In 476949 perches, how many acres?
13. How many cords of wood are there in a pile containing 674969 cubic inches?
14. Reduce 47 cu. yd. 15 cu. ft. 162 cu in. to cubic inches.
15. Reduce 45 ch. 18 bu. to pecks.
16. How many more feet are there in 16 miles than in 14 mi. 7 fur. 29 rd.?
17. How many pints are there in a cask of wine, containing 76 gallons?
18. How many gills are there in 17 hhd. 49 gal. 1 qt.?
19. How many bottles, containing 6 gills each, can be filled from a cask of wine, containing 48 gal.?
20. How much must be paid for 3 pi. 1 hhd. 47 gal. 3 qt. 1 pt. of wine at 34 cents per pint?
21. In 15 tun 1 pi. 1 hhd. 61 gal., how many gills are there?
22. How many grains in a bar of gold, whose weight is 2 lb. 7 oz. 14 pwt. 13 gr.?
23. What must be given for 145 ch. 26 bu. of coal at 25 cents per bushel?
24. How much will be paid for the labor of 42 weeks,

- allowing 6 days to the week, and 10 hours to the day, at the rate of \$0.25 per hour?
25. Reduce 17 tons to quarter pounds.
26. Reduce 9 weeks to minutes and to sixths of minutes.
27. How many ounces are there in 2 hogsheads of tobacco, each weighing 14 cwt. 3 qr. 15 lb.?
28. How many pints are there in 6 casks of wine, each containing 1 hhd. 39 gal. 3 qt. 1 pt.?
29. Reduce 56746896 drams, Avoirdupois, to tons.
30. What will be the cost of 37608 eggs at 9 cents per dozen?
31. If a ship has on board 1525 bales of cotton, each weighing 675 pounds, how many tons has it?
32. If one book requires 350 sheets of paper, how many reams would be required to print 850 copies?
33. How many yards of cloth are there in 6752 nails? and what is its value at \$2.25 per yard?
34. Reduce 265 yd. 3 qr. 1 na. 1 in. to inches.
35. Reduce 569646 inches to yards.
36. Change 476 ells French to inches.
37. How many feet are there in a telegraphic wire that reaches a distance of 256 mi. 5 fur. 17 rd.?
38. How many inches from each other are two cities that are 63 miles apart?
39. How many yards of cloth at \$1.75 per yard, can be bought for \$47.50?
40. How many pair of pantaloons, each requiring  $2\frac{1}{2}$  yd., can be made from  $37\frac{1}{2}$  yd. of cloth?
41. If a suit of clothes requires 4 yd. 3 qr. of cloth, how many suits can be made from 76 yd.?
42. If the circumference of a wheel is 16 ft. 3 in., how many times will it turn in going a distance of 36 miles?

## ADDITION.

135. ADDITION OF DENOMINATE NUMBERS is the operation of finding a the sum of two or more denominate numbers.

1. What is the sum of £6 8s. 9d., £7 5s. 7d., and £3 15s. 10d.?

Rule.—I. Write the numbers to be added, so that units of the same name shall stand in the same column:

OPERATION.			
£.	s.	d.	
6	8	9	
7	5	7	
3	15	10	
£ 17	10	2	

II. Begin with the lowest denomination, and add as in simple numbers; divide the sum of each column by the units of the scale, and add the quotient to the next column.

Proof.—The same as in simple numbers.

## Examples.

(1.)	(2.)	(3.)
£. s. d.	yd. ft. in.	£. s. d. far.
4 15 8	14 2 10	8 5 7 3
3 4 7	7 2 11	5 3 4 2
2 1 1	3 2 9	4 12 9 2
10 1 4	26 2 6	18 1 9 3

(4.)	(5.)	(6.)
bu. pk. qt.	lb. oz. dr.	° ' "
13 3 6	15 12 15	27 36 37
14 2 7	13 15 6	5 15 20
13 3 5	14 9 3	6 45 50

(7.)

£.	s.	d.
5	17	9
6	13	4
<u>2</u>	<u>11</u>	<u>6</u>

(8.)

£.	s.	d.
49	19	10 $\frac{1}{4}$
63	10	11 $\frac{1}{2}$
<u>71</u>	<u>8</u>	<u>8<math>\frac{3}{4}</math></u>

(9.)

mi.	fur.	rd.
69	7	39
91	6	10
<u>47</u>	<u>1</u>	<u>18</u>

(10.)

T.	cwt.	qr.	lb.
96	15	3	16
74	12	1	10
<u>68</u>	<u>17</u>	<u>2</u>	<u>12</u>

(11.)

cwt.	qr.	lb.	oz.
75	1	17	9
64	3	14	12
<u>30</u>	<u>1</u>	<u>15</u>	<u>15</u>

(12.)

lb.	oz.	pwt.	gr.
36	9	16	23
97	11	20	19
<u>60</u>	<u>10</u>	<u>19</u>	<u>7</u>

(13.)

mi.	fur.	rd.	yd.
19	6	15	4
74	7	34	4
56	1	25	4
<u>17</u>	<u>5</u>	<u>16</u>	<u>3</u>

(14.)

R.	P.	sq. yd.	sq. ft.	sq. in.
3	26	16	8	120
1	39	12	7	136
3	21	9	1	112
<u>1</u>	<u>32</u>	<u>7</u>	<u>5</u>	<u>132</u>

15. A mechanic worked on Monday, 14 hr. 15 min.; on Tuesday, 12 hr. 3 min.; on Wednesday, 12 hr. 45 min.; on Thursday, 17 hr. 16 min.; on Friday, 16 hr. 25 min.; on Saturday, 14 hr. 35 min.: how much time did he work during the six days?

16. What amount of sugar in 5 boxes, weighing as follows: 1st, 17 cwt. 3 qr. 18 lb.; 2d, 12 cwt. 1 qr. 17 lb.; 3d, 15 cwt. 2 qr. 4 lb.; 4th, 9 cwt. 19 lb.; and 5th, 13 cwt. 3 qr. 13 lb.?

17. What quantity of oats in a bin into which has been put 6 bu. 3 pk. 7 qt.; 9 bu. 2 pk. 6 qt.; 14 bu. 3 pk.; 25 bu. 1 pk. 3 qt.; 17 bu.; 35 bu. 1 pk. 6 qt.; and 27 bu. 1 pk. 5 qt.?

18. What quantity of cloth is in the following pieces: 1st, 31 yd. 3 qr. 3 na.; 2d, 37 yd. 1 qr.; 3d, 42 yd. 3 qr. 3 na.; 4th, 32 yd. 2 qr. 2 na.; and 5th, 35 yd. 1 qr. 3 na.?

19. What is the sum of 275 da. 11 hr. 50 min. 30 sec.; 106 da. 13 hr. 40 min. 40 sec.; 300 da. 18 hr. 18 min. 25 sec.; 212 da. 6 hr.; 65 da. 30 min. 30 sec.; and 1 da. 1 hr. 1 min.?

20. A gentleman bought 4 pieces of land: the first contained 85 A. 3 R. 14 P.; the second, 62 A. 1 R. 15 P.; the third, 14 A. 3 R. 13 P.; and the fourth, 25 A. 35 P.: how much land did he purchase?

21. A silver spoon weighs 13 pwt. 16 gr.; a knife, 18 pwt. 12 gr.; a cup, 7 oz. 5 pwt. 10 gr.; a napkin ring, 1 oz. 10 pwt.; a candlestick, 10 oz. 15 pwt. 20 gr.: what is the entire weight of these 5 articles?

22. A ship sails, on the 1st day, 219 mi. 6 fur. 32 rd.; the 2d, 230 mi. 3 fur. 30 rd.; on the 3d, 196 mi. 5 fur. 20 rd.; on the fourth, 212 mi.; on the 5th, 216 mi. 7 fur. 27 rd.; and on the 6th day, 225 mi. 5 fur. 29 rd.: how far did it sail in the 6 days?

23. A merchant received 6 casks of molasses, marked as follows: 1st, 1 hhd. 23 gal. 3 qt.; 2d, 2 hhd. 43 gal.; 3d, 49 gal. 3 qt.; 4th, 2 hhd. 35 gal. 1 qt.; 5th, 1 hhd. 51 gal. 2 qt. 1 pt.; and 6th, 2 hhd. 42 gal.: what quantity was received?

24. What is the value, at 6 cents per pound, of the following lots of sugar: 1st, 3 cwt. 3 qr. 3 lb.; 2d, 10 cwt. 1 qr. 10 lb.; 3d, 14 cwt. 2 qr. 13 lb.; 4th, 16 cwt. 2 qr. 20 lb.?

25. A farmer raised from one field, 39 bu. 3 pk. 6 qt. of wheat; from 2d, 45 bu. 2 pk. 3 qt.; from 3d, 26 bu. 1 pk. 5 qt.; from 4th, 35 bu. 3 pk. 5 qt.; and from 5th, 46 bu. 3 pk. 2 qt.: what was raised from all the fields?

26. A person offers £495 11s. 6d. for a house; the owner offers to sell it at an advance of £26 9s. 9d. on the amount offered: what price was demanded for the house?

## SUBTRACTION.

136. SUBTRACTION OF DENOMINATE NUMBERS is the operation of finding the difference between two denominate numbers.

1. What is the difference between 8 bu. 2 pk. 6 qt., and 5 bu. 3 pk. 7 qt.?

Rule.—I. Set down the less number under the greater, placing units of the same value in the same column.

II. Begin with the lowest denomination, and subtract as in simple numbers, borrowing and carrying when necessary, according to the scale.

Proof.—The same as in simple numbers.

## Examples.

(1.)				(2.)				(3.)			
£.	s.	d.		£.	s.	d.	far.	£.	s.	d.	
From	127	14	5	292	17	3	1	1	9	6 $\frac{1}{2}$	
Take	89	17	9	169	18	10	3	0	19	10 $\frac{3}{4}$	
	37	16	8	122	18	4	2	9	7 $\frac{3}{4}$		

  

(4.)				(5.)				(6.)			
Tons.	cwt.	qr.	lb.	cwt.	qr.	lb.	oz.	yd.	qr.	na.	
From	262	15	1 16	7	0	5	11	461	2	1	
Take	197	17	2 24	5	3	17	15	279	3	3	

  

(7.)				(8.)			
mi.	fur.	rd.	yd. ft.	Tuns.	pl.	hhd.	gal. qt. pt. gills.
From	161	1	19 2 1	226	1	1	21 3 0 1
Take	79	6	27 4 2	179	1	1	39 3 1 3

9. What is the difference of £21 14s. 6d. and £19 19s. 11d.?

10. How much is 161 lb. 3 oz. 11 pwt. 16 gr. greater than 98 lb. 7 oz. 15 pwt. 21 gr.?

11. Find the difference of 120 A. 1 R. 29 P. 16 sq. yd. 6 sq. ft., and 65 A. 3 R. 39 P. 20 sq. yd. 8 sq. ft.?

12. If, from a piece of cloth, containing 32 yd. 3 qr., a tailor cuts 14 yd. 3 qr. 2 na., how much will be left?

13. From a cask of wine containing 1 hhd. 15 gal., there were drawn 39 gal. 3 qt. 1 pt.: what quantity was left?

14. A mason was engaged to put up a wall of 37 yd. 2 ft. 6 in. in length: after building 19 yd. 2 ft. 9 in., how much remained to be built?

15. A grocer took 9 cwt. 1 qr. 15 lb. from a box of sugar which contained 16 cwt. 10 lb.: how much was left?

16. How much does 116 ch. 16 bu. 2 pk. exceed 89 ch. 29 bu. 3 pk.?

17. If 17  $\text{H}$  11  $\frac{3}{4}$  7 3 1  $\text{O}$  16 gr. be taken from 21  $\text{H}$  6  $\frac{3}{4}$  3 3 1  $\text{O}$  5 gr., what will be left?

18. Subtract 29 lb. 10 oz. 14 pwt. from 51 lb. 1 oz. 10 pwt. 6 gr.

19. Subtract 19 tons 17 cwt. 1 qr. 16 lb. from 21 tons 15 cwt.

20. If a quantity of flour, which cost £123 16s. 7d., be sold for £131 6s. 6d., what will be the gain?

21. A cask can hold 2 hhd. 15 gal.: 59 gal. 1 qt. 1 pt. have been put in it: how much more will it hold?

22. One piece of calico contains 36 yd. 1 qr.; another piece 32 yd. 3 qr. 2 na.: how much more in one piece than in the other?

## MULTIPLICATION.

137. MULTIPLICATION OF DENOMINATE NUMBERS is the operation of taking a denominate number as many times as there are units in the multiplier.

1. Multiply 6 T. 14 cwt. 2 qr. 15 lb. by 3.

Rule.—I. Write down the denominate number, and set the multiplier under the lowest denomination:

II.—Multiply as in simple numbers, and in passing from one denomination to another, divide by the units of the scale, set down the remainder, and carry the quotient to the next product.

OPERATION.				
T.	cwt.	qr.	lb.	
6	14	2	15	
				3
<hr/>				
20	3	3	20	

## Examples.

(1.)

£.	s.	d.
3	4	9
		4
<hr/>		
12	19	0

(2.)

bu.	pk.	qt.
6	3	6
		5
<hr/>		
34	2	6

(3.)

cwt.	qr.	lb.
2	3	20
		7
<hr/>		
20	2	15

(4.)

yd.	ft.	in.
9	2	8
		8
<hr/>		

(5.)

mi.	fur.	rd.
17	6	30
		9
<hr/>		

(6.)

wk.	da.	hr.
15	6	19
		6
<hr/>		

7. Multiply 3 A. 5 R. 18 P. by 6.  
 8. How many gallons in 3 casks, each containing 30 gal. 3 qt. 1 pt.?

9. Multiply 27 bu. 3 pk. 4 qt. 1 pt. by 7.  
 10. What is the product of 5 lb 8  $\frac{3}{4}$  4 3 6  $\frac{3}{4}$  12 gr. multiplied by 9?  
 11. Multiply 7 wk. 6 da. 9 hr. 10 min. by 5.  
 12. If 1 piece of calico costs £1 8s. 6 $\frac{1}{2}$ d., what will 8 pieces cost?  
 13. If a pipe discharges 169 gal. 3 qt. 1 pt. of water in 1 hour, how much will it discharge in 5 hours?  
 14. If each of 9 plots of ground contains 3 A. 1 R. 25 P., how much in all the plots?  
 15. Multiply 6 bu. 3 pk. 2 qt. 1 pt. by 24 = 4  $\times$  6.

OPERATION.							
bu.	pk.	qt.	pt.	bu.	pk.	qt.	pt.
6	3	2	1	27	1	2	0
			4				6
<hr/>				<hr/>			
27	1	2	0	163	3	4	0

NOTE.—When the multiplier is a composite number, multiply by the factors separately.

16. How much calico in 12 pieces, each of which contains 377 yd. 3 qr.?  
 17. Ten men have been employed in a factory 14 da. 15 hr. 30 min.: how long must one man be employed to do an equal amount of work?  
 18. What is the product of £3 8s. 9d. 3far. by 14.  
 19. Multiply 16 da. 8 hr. 15 min. by 28.  
 20. How much water will 14 casks contain if one cask holds 31 gal. 2 qt. 1 pt.?  
 21. If, to make one book, 1 ream 6 quires and 14 sheets of paper are required, how much will be necessary for 100 books?  
 22. If a vessel can carry 175 tons 1 cwt. 3 qr. 18 lb. of railroad iron, how much can 7 such vessels carry?

23. A man divided his farm among 5 sons, giving to each 121 A. 1 R. 35 P.: how large was the farm?

24. If a man works at his trade 9 hr. 45 sec. per day, how much does he work in 2 weeks 4 days?

25. A horse car makes 6 trips per day over a road 3 mi. 1 fur. 29 rd. in length: how far does it run?

26. How many bushels in 24 barrels of potatoes, if each barrel contains 1 bu. 2 pk. 4 qt.?

27. If a bottle of cider contains 1 pt. 3 gi., how much will 4 dozen bottles contain?

28. If a man can mow 1 A. 2 R. 39 P. of grass in 1 day, how much can he mow in 11 days?

29. If a hogshead of molasses contains 61 gal. 2 qt. 1 pt., how much will 14 hogsheads contain?

30. If a vessel sails 14 L. 1 mi. 6 fur. 17 rd. in 1 day, how far will it sail in the month of January?

31. If a person sleeps 7 hr. 15 min. 15 sec. daily, how much will he sleep in 3 weeks?

32. How many yards of cloth in 36 pieces, if each piece contains 27 yd. 3 qr.?

33. If 1 silver spoon weighs 1 oz. 11 pwt. 12 gr., what will be the weight of 1 dozen of the same kind?

34. The earth revolves  $0^{\circ} 15'$  of space in 1 minute of time: how far does it revolve in 1 hour?

35. If 1 silver cup weighs 9 oz. 10 pwt. 16 gr., how much will 15 such cups weigh?

36. The multiplier is 18, and the multiplicand 7 bu. 2 pk. 5 qt., what is the product?

37. What is the weight of 9 boxes of sugar, if each weighs 17 cwt. 1 qr. 16 lb.?

38. What is the product of 56 A. 3 R. 21 P. by 6?

39. If 4 tons. 15 cwt. 1 qr. 10 lb. of hay will last a horse for one year, how much would 15 horses require?

## DIVISION.

138. DIVISION OF DENOMINATE NUMBERS is the operation of dividing a denominate number into equal parts; or, of finding how many times one denominate number is contained in another.

1. Divide 16 cwt. 3 qr. 21 lb. by 3.

## Rule.

OPERATION.

cwt. qr. lb.

I. *Begin with the highest denomination, and divide as in simple numbers:*

$$\begin{array}{r} 3 \overline{) 16 \ 3 \ 20} \\ \underline{5 \ 2 \ 15} \end{array}$$

II. *Reduce the remainder, if any, to the next lower denomination, and add in the units of that denomination, for a new dividend:*

III. *Proceed in the same manner, through all the denominations.*

Proof.—Multiply the quotient by the divisor.

NOTES.—1. If the divisor is a composite number, we may divide by the factors in succession, as in simple numbers.

2. Each quotient figure has the same unit as the dividend from which it was derived.

## Examples.

(1.)	(2.)	(3.)
$\begin{array}{r} \text{£.} \quad \text{s.} \quad \text{d.} \\ 4 \overline{) 12 \ 19 \ 0} \\ \underline{3 \ 4 \ 9} \end{array}$	$\begin{array}{r} \text{bu.} \quad \text{pk.} \quad \text{qt.} \\ 5 \overline{) 34 \ 2 \ 6} \\ \underline{6 \ 3 \ 6} \end{array}$	$\begin{array}{r} \text{cwt.} \quad \text{qr.} \quad \text{lb.} \\ 7 \overline{) 20 \ 2 \ 15} \\ \underline{2 \ 3 \ 20} \end{array}$
(4.)	(5.)	
$\begin{array}{r} \text{mi.} \quad \text{fur.} \quad \text{rd.} \\ 6 \overline{) 56 \ 5 \ 4} \end{array}$	$\begin{array}{r} \text{s.} \\ 3 \overline{) 27} \end{array}$	$\begin{array}{r} \text{o} \quad \text{'} \quad \text{"} \\ 28 \quad 22 \quad 45 \end{array}$

(6.)				(7.)							
yr.	mo.	da.	hr.	T.	cwt.	qr.	lb.	oz.	dr.		
5)	32	3	18	18	8)	53	3	2	16	4	8

8. If 7 loads of wood contain 8 C. 6 C. ft., what will 1 load contain?
9. What will be the weight of 1 tierce of rice, if 7 tierces weigh 1 ton 19 cwt. 2 qr. 12 lb.?
10. If 4 equal packages of medicines weigh 13 lb 7  $\frac{3}{4}$  23  $\frac{1}{8}$  4 gr., what will be the weight of each.
11. How far will a man travel in 1 day, if in 5 days he travels 122 mi. 4 fur. 23  $\frac{3}{4}$  rd.?
12. If 9 equal fields contain 111 A. 2 R. 25 P., how much is there in each field?
13. If 9 equal pieces of calico contain 267 yd. 0 qr. 3 na., how much is there in each piece?
14. If a vessel running at an equal rate, sails 47 L. 1 mi. 7 fur. 8 rd., in 8 days, how far does she sail in 1 day?
15. If a steamer moves at the rate of 15 mi. 2 fur. 40 rd. per hour, what is the rate per minute?
16. A cartman carried 117 cords 110 feet of wood in 100 loads: how much did he carry at each load?
17. If a quantity of provisions will last one man for 2 weeks 6 days, how long will it last 50 men?
18. A person wishes to perform a journey of 165 mi. in 16 hours: at what rate must he travel?
19. How many suits of clothes, each requiring 7 yd. 2 qr., can be cut from a piece of cloth containing 67 yd. 2 qr.?
20. A ship has 468 T. 2 cwt. 2 qr. of railroad iron, and a wagon can carry 2 tons 3 cwt. 3 qr.: how many wagon-loads in the entire cargo?

## ANALYSIS.

139. An ANALYSIS is an examination of the separate parts of a question, and of their connection with each other.

In analyzing, we reason from a *given number* to its *unit*, and then from this unit to the *required number*, or answer.

The processes are indicated by the relations which exist between the given and required numbers, and are pursued, step by step, independently of set rules.

## CASE I.

140. To find the cost of several things, when the price of a single thing is an aliquot part of 1 dollar.

1. What is the cost of 75 yards of cotton cambric, at 33  $\frac{1}{3}$  cents per yard?

ANALYSIS.—33 $\frac{1}{3}$ cents = $\frac{1}{3}$ of a dollar: 75 yards, at \$1 a yard, would cost \$75; at $\frac{1}{3}$ of a dollar a yard, it would cost $\frac{1}{3}$ of \$75, which is \$25: Hence,	OPERATION. $\begin{array}{r} 3 \overline{) 75} \\ \underline{60} \\ 15 \end{array}$ \$ 25
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## Rule.

*Take such a part of the number of things, as the price of a single thing is of \$1.*

## Examples.

1. What is the cost of 200 yards of cambric, at 25 cents a yard?
2. What will be the cost of 300 pencils, at 12  $\frac{1}{2}$  cents each?
3. What will be the cost of 150 tops, at 6  $\frac{1}{4}$  cents apiece?
4. What will 500 melons cost, at 5 cents apiece?
5. What will be the cost of 150 gallons of molasses, at 33  $\frac{1}{3}$  cents per gallon?