

pin for  $\frac{5}{2}$  of a dollar, and an inkstand for  $\frac{3}{14}$  of a dollar: how much did she pay in all?

4. William buys a kite for  $\frac{2}{3}$  of a dollar, and a string for  $\frac{4}{15}$  of a dollar: how much did he pay?

5. Three ducks cost  $\frac{4}{5}$  of a dollar, two fowls  $\frac{2}{3}$  of a dollar, and two geese  $\frac{9}{8}$  of a dollar: what is the entire cost?

6. Two sheep cost  $\frac{17}{2}$  of a dollar, a calf  $\frac{9}{4}$  of a dollar, and a lamb  $\frac{5}{4}$  of a dollar: what is the entire cost?

7. Three yards of shirting cost  $\frac{4}{9}$  of a dollar, a handkerchief  $\frac{7}{9}$  of a dollar, and a pair of gloves  $\frac{1}{3}$  of a dollar: what is the entire cost?

8. A person paid  $\frac{4}{5}$  of a dollar for butter,  $\frac{3}{8}$  of a dollar for tea, and  $\frac{9}{16}$  of a dollar for coffee: what was paid for the three articles?

9. A person received  $5\frac{4}{5}$  dollars on Monday,  $8\frac{3}{8}$  dollars on Tuesday, and  $7\frac{2}{3}$  dollars on Wednesday: how much did he receive during the three days?

10. A man who had spent  $9\frac{7}{8}$  dollars for a coat, and  $2\frac{3}{4}$  dollars for a vest, had  $6\frac{2}{7}$  dollars remaining: how much had he at first?

11. In doing a piece of work, a laborer was employed  $9\frac{1}{2}$  days, a second was employed  $8\frac{2}{3}$  days, and a third was engaged  $5\frac{5}{6}$  days: how many days were the three laborers employed?

12. A person who had  $4\frac{2}{5}$  dollars, earned  $6\frac{4}{7}$  dollars: if, in addition, he had received a present of  $5\frac{1}{4}$  dollars, how much would he then have had?

13. A person paid  $17\frac{4}{5}$  dollars for groceries; he lost  $10\frac{5}{12}$  dollars in going home, and had  $16\frac{2}{5}$  dollars remaining: how much had he at first?

14. A scholar, in adding several fractions, obtained  $2\frac{5}{6}$  for the sum, but he omitted to add  $1\frac{9}{10}$ : what was the correct sum?

15. A person paid his butcher  $9\frac{1}{5}$  dollars, which was  $2\frac{5}{8}$  dollars too little: what was the amount due?

## SUBTRACTION.

78. SUBTRACTION is the operation of finding the difference between two fractions.

## CASE I.

79. When the denominators are the same.

1. What is the difference between  $\frac{5}{4}$  and  $\frac{3}{4}$ ?

Rule.—*Subtract the less numerator from the greater, and place the difference over the common denominator.*

OPERATION.  
 $5 - 3 = 2.$   
*Ans.*  $\frac{2}{4}.$

## Examples.

- |   |   |
|---|---|
| 1. From $\frac{15}{8}$ take $\frac{7}{8}.$    | 5. From $\frac{19}{54}$ take $\frac{17}{54}.$     |
| 2. From $\frac{6}{9}$ take $\frac{2}{9}.$     | 6. From $\frac{17}{45}$ take $\frac{15}{45}.$     |
| 3. From $\frac{16}{30}$ take $\frac{12}{30}.$ | 7. From $\frac{19}{27}$ take $\frac{6}{27}.$      |
| 4. From $\frac{27}{50}$ take $\frac{9}{50}.$  | 8. From $\frac{120}{150}$ take $\frac{115}{150}.$ |

## CASE II.

80. When the denominators are different.

1. What is the difference between  $\frac{5}{8}$  and  $\frac{3}{7}$ ?

## Rule.

I. *Reduce the fractions to a common denominator.*

II. *Subtract the less numerator from the greater, and place their difference over the common denominator.*

OPERATION.  
 $5 \times 7 = 35$  1st num.  
 $3 \times 8 = 24$  2d num.  
 $7 \times 8 = 56$  com. den.  
 $\frac{5}{8} - \frac{3}{7} = \frac{35}{56} - \frac{24}{56} =$   
 $= \frac{11}{56},$  *Ans.*

NOTE.—If there are mixed numbers, reduce them to improper fractions, and reduce all compound fractions to simple ones.

## Examples.

- |  |   |
|--|---|
| 1. From $\frac{5}{6}$ take $\frac{3}{4}$ .       | 9. From $\frac{1}{2}$ of $\frac{5}{6}$ take $\frac{9}{25}$ .    |
| 2. From $\frac{7}{9}$ take $\frac{3}{5}$ .       | 10. Take $\frac{3}{4}$ of $\frac{5}{11}$ from $4\frac{4}{27}$ . |
| 3. From $\frac{8}{11}$ take $\frac{4}{9}$ .      | 11. Take $6\frac{3}{5}$ from 8.                                 |
| 4. From $6\frac{1}{2}$ take $5\frac{2}{3}$ .     | 12. Take $7\frac{2}{3}$ from $9\frac{3}{7}$ .                   |
| 5. From $1\frac{1}{2}$ subtract $\frac{9}{16}$ . | 13. From $\frac{8}{13}$ take $\frac{3}{4}$ of $\frac{4}{27}$ .  |
| 6. From $\frac{16}{19}$ take $\frac{12}{15}$ .   | 14. Subtract $\frac{3}{16}$ from $\frac{7}{15}$ .               |
| 7. From $\frac{13}{21}$ take $\frac{15}{20}$ .   | 15. Subtract $\frac{7}{20}$ from $\frac{7}{10}$ .               |
| 8. From $1\frac{1}{5}$ take $\frac{2}{15}$ .     | 16. From $3\frac{7}{30}$ take $\frac{9}{100}$ .                 |

## Practical Questions.

- James gave  $\frac{7}{8}$  of a shilling for a top, and  $\frac{1}{3}$  of a shilling for an orange: how much more did he give for the top than for the orange?
- John gave  $\frac{7}{8}$  of a dollar for a pair of gloves, and  $\frac{3}{5}$  of a dollar for a pocket handkerchief: how much more did his gloves cost him than his handkerchief?
- From the sum of  $\frac{5}{6}$  and  $2\frac{3}{4}$  take  $\frac{4}{5}$  of  $\frac{4}{5}$ .
- What is the difference of  $2\frac{7}{8}$  dollars and  $\frac{2}{5}$  of  $1\frac{1}{2}$  dollar?
- What is the difference of  $\frac{11}{20}$  of a pound and  $\frac{5}{21}$  of a pound?
- A person, who had  $5\frac{3}{5}$  dollars, spent  $4\frac{5}{6}$  dollars for groceries: what had he left?
- A person paid  $4\frac{2}{9}$  dollars for a barrel of flour, and sold it for  $6\frac{1}{3}$  dollars: how much was gained?
- If from a barrel, that contains  $31\frac{1}{2}$  gallons of wine,  $15\frac{5}{8}$  gallons are drawn: how much remains in it?
- How much is  $6\frac{3}{7}$  greater than  $\frac{3}{4}$  of  $4\frac{2}{5}$ ?
- A cap is valued at  $1\frac{5}{8}$  dollars, but the buyer has only  $1\frac{1}{5}$  dollars: how much does he require, to pay for it?

## MULTIPLICATION.

81. MULTIPLICATION OF FRACTIONS is the operation of taking one number as many times as there are units in another, when one or both are fractional.

## CASE I.

82. To multiply a fraction by a whole number.

1. If one yard of cloth costs  $\frac{3}{10}$  of a dollar, what will 5 yards cost?

1ST OPERATION.

$$\frac{3}{10} \times 5 = \frac{3 \times 5}{10} = \frac{15}{10} = 1\frac{1}{2}$$

Rule.

Multiply the numerator,  
or divide the denominator.

2D OPERATION.

$$\frac{3}{10} \times 5 = \frac{3}{10 \div 5} = \frac{3}{2} = 1\frac{1}{2}$$

## Examples.

- |                                    |  |
|------------------------------------|--|
| 1. Multiply $\frac{7}{8}$ by 4.    | 6. Multiply $\frac{2}{5}$ of $\frac{6}{7}$ by 9.   |
| 2. Multiply $\frac{6}{9}$ by 8.    | 7. Multiply $\frac{6}{5}$ of $\frac{3}{11}$ by 12. |
| 3. Multiply $\frac{6}{32}$ by 16.  | 8. Multiply $\frac{5}{8}$ of $\frac{2}{7}$ by 18.  |
| 4. Multiply $\frac{25}{4}$ by 13.  | 9. Multiply $\frac{3}{7}$ of $\frac{2}{9}$ by 17.  |
| 5. Multiply $\frac{14}{16}$ by 16. | 10. Multiply $\frac{6}{15}$ of 2 by 15.            |

## CASE II.

83. To multiply a whole number by a fraction.

1. If 1 yard of cloth costs 6 dollars, what will  $\frac{7}{8}$  of a yard cost?

Rule.—Multiply the whole  
number by the numerator,  
and divide the product by  
the denominator.

OPERATION.

$$6 \times \frac{7}{8} = \frac{6 \times 7}{8} = \frac{42}{8} = 5\frac{1}{4}$$

## Examples.

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. Multiply 6 by $\frac{3}{5}$ .   | 5. Multiply 35 by $\frac{15}{7}$ .   |
| 2. Multiply 10 by $\frac{7}{5}$ .  | 6. Multiply 32 by $\frac{16}{17}$ .  |
| 3. Multiply 16 by $\frac{4}{5}$ .  | 7. Multiply 100 by $\frac{9}{12}$ .  |
| 4. Multiply 20 by $\frac{11}{5}$ . | 8. Multiply 117 by $\frac{13}{18}$ . |
9. If 1 month's wages amount to 45 dollars, what are the wages for  $\frac{9}{15}$  of a month?
10. What will  $\frac{7}{8}$  of a yard of cloth cost, if one yard costs 125 cents?
11. What will  $\frac{9}{16}$  of a ton of iron be worth, if one ton is valued at 46 dollars?

## CASE III.

84. To multiply a whole number by a mixed number.

1. Multiply 16 by  $5\frac{2}{3}$ .

Rule.—First multiply by the fractional part, and then by the whole number, and add the products.

$$\begin{array}{r} \text{OPERATION.} \\ 16 \times \frac{2}{3} = \frac{32}{3} = 10\frac{2}{3} \\ 16 \times 5 = 80 \end{array}$$

Ans.  $90\frac{2}{3}$ .

## Examples.

- |                                    |                                     |
|------------------------------------|-------------------------------------|
| 1. Multiply 15 by $5\frac{3}{4}$ . | 5. Multiply 45 by $6\frac{1}{3}$ .  |
| 2. Multiply 18 by $5\frac{1}{4}$ . | 6. Multiply 84 by $7\frac{7}{12}$ . |
| 3. Multiply 60 by $6\frac{2}{3}$ . | 7. Multiply 64 by $6\frac{3}{8}$ .  |
| 4. Multiply 32 by $9\frac{7}{8}$ . | 8. Multiply 96 by $4\frac{3}{12}$ . |
9. If one barrel of flour costs 7 dollars, what will  $6\frac{2}{3}$  barrels cost?
10. What must be paid for  $9\frac{3}{4}$  yards of cloth, at 6 dollars a yard?
11. If the wages for a month are 36 dollars, what are the wages for  $9\frac{5}{6}$  months?

## CASE IV.

85. To multiply one fraction by another.

1. If a bushel of corn costs  $\frac{7}{8}$  of a dollar, what will  $\frac{3}{7}$  of a bushel cost?

Rule.—Multiply the numerators together for a new numerator, and the denominators together for a new denominator.

## OPERATION.

$$\frac{7}{8} \times \frac{3}{7} = \frac{7 \times 3}{8 \times 7} = \frac{21}{56} = \frac{3}{8}.$$

## Examples.

- |  |  |
|--|--|
| 1. Multiply $\frac{7}{9}$ by $\frac{2}{3}$ .   | 5. Multiply $4\frac{1}{2}$ by $2\frac{1}{4}$ .                 |
| 2. Multiply $\frac{5}{6}$ by $\frac{4}{7}$ .   | 6. Multiply $\frac{2}{5}$ of $\frac{6}{7}$ by $\frac{1}{8}$ .  |
| 3. Multiply $\frac{7}{8}$ by $\frac{3}{5}$ .   | 7. Multiply $\frac{6}{7}$ of $\frac{4}{5}$ by $\frac{3}{9}$ .  |
| 4. Multiply $\frac{5}{12}$ by $\frac{13}{4}$ . | 8. Multiply $\frac{1}{2}$ of $\frac{9}{16}$ by $\frac{4}{9}$ . |

## Practical Questions.

1. If 1 yard of cloth costs  $1\frac{3}{4}$  dollars, what will  $\frac{7}{8}$  of a yard cost?
2. If 1 pound of tea costs  $\frac{8}{9}$  of a dollar, what will  $2\frac{1}{2}$  pounds cost?
3. At  $8\frac{1}{2}$  cents a dozen, what will be the cost of  $3\frac{1}{3}$  dozen of apples?
4. James paid  $9\frac{3}{4}$  cents for a top: how much must he pay for 9 tops?
5. At  $2\frac{5}{8}$  dollars a head, what would be the cost of 15 sheep?
6. If 1 pair of gloves costs  $\frac{7}{8}$  of a dollar, what will 8 pair cost?
7. If 1 bushel of barley costs  $\frac{7}{8}$  of a dollar, what will  $6\frac{3}{4}$  bushels cost?
8. If one goose costs  $\frac{3}{4}$  of a dollar, what will 12 geese cost?

9. What will  $3\frac{1}{2}$  pounds of butter cost, at  $\frac{1}{5}$  of a dollar a pound?
10. Multiply  $\frac{1}{2}$  of  $\frac{3}{7}$  of 6 by  $\frac{5}{7}$  of  $9\frac{1}{2}$ .
11. What is the product of the three fractions,  $\frac{5}{6}$ ,  $\frac{7}{8}$ , and  $\frac{9}{10}$ ?
12. What is the product of the fractions,  $\frac{1}{2}$ ,  $\frac{2}{13}$ ,  $\frac{4}{5}$ , and  $\frac{9}{11}$ ?
13. If a bushel of apples costs  $\frac{3}{4}$  of a dollar, what will  $\frac{2}{3}$  of a bushel cost?
14. If a yard of muslin is worth  $\frac{3}{10}$  of a dollar, what is the worth of  $\frac{7}{8}$  of a yard?
15. What will be the cost of  $7\frac{2}{5}$  pounds of butter, at  $\frac{2}{5}$  of a dollar per pound?
16. If a person travels  $3\frac{7}{8}$  miles per hour, how far will he travel in  $4\frac{5}{8}$  hours?
17. If John earns  $1\frac{5}{8}$  dollars per day, how much will he earn in  $\frac{7}{12}$  of a day?
18. A father has five children, and gives to each  $\frac{3}{7}$  of a dollar: how much does he give them?
19. If Lucy can hem  $1\frac{3}{4}$  yards in 1 hour, how much can she hem in  $2\frac{1}{2}$  hours?
20. If 1 pound of tea costs  $\frac{5}{7}$  of a dollar, what will be the cost of  $2\frac{1}{4}$  pounds?
21. If it requires  $3\frac{1}{4}$  yards of cloth for a suit of clothes, how much will be necessary to make 6 suits?
22. If James can earn  $4\frac{1}{5}$  cents in one hour, how much can he earn in  $3\frac{1}{4}$  hours?
23. If muslin is  $13\frac{4}{8}$  cents a yard, what will be the cost of  $5\frac{3}{4}$  yards?
24. If apples are  $2\frac{7}{8}$  dollars a barrel, what will be the cost of  $5\frac{1}{2}$  barrels?

## DIVISION.

86. DIVISION OF FRACTIONS is the operation of finding how many times one number is contained in another, when one or both, are fractional.

## CASE I.

87. To divide a fraction by a whole number.

1. If 5 yards of muslin cost  $\frac{10}{11}$  of a dollar, what will 1 yard cost?

ANALYSIS.—1 yard will cost one-fifth as much as 5 yards.

OPERATION.

$$\frac{10}{11} \div 5 = \frac{10 \div 5}{11} = \frac{2}{11}.$$

Multiplying the denominator by 5 will produce the same result.

$$\frac{10}{11} \div 5 = \frac{10}{11 \times 5} = \frac{10}{55} = \frac{2}{11}.$$

NOTE.—Divide the numerator, when it is exactly divisible by the divisor: when it is not, multiply the denominator.

## Rule.

*Divide the numerator, or multiply the denominator, by the divisor.*

## Examples.

- |                                  |  |
|----------------------------------|--|
| 1. Divide $\frac{8}{17}$ by 2.   | 11. Divide $\frac{12}{7}$ by 7.                                  |
| 2. Divide $\frac{6}{11}$ by 3.   | 12. Divide $\frac{1}{2}$ of $\frac{7}{8}$ by 6.                  |
| 3. Divide $\frac{9}{10}$ by 7.   | 13. Divide $\frac{1}{3}$ of 4 by 9.                              |
| 4. Divide $\frac{12}{15}$ by 6.  | 14. Divide $\frac{3}{4}$ of $\frac{3}{7}$ by 8.                  |
| 5. Divide $\frac{7}{8}$ by 10.   | 15. Divide $\frac{6}{9}$ of $\frac{3}{4}$ by 10.                 |
| 6. Divide $\frac{16}{19}$ by 8.  | 16. Divide $\frac{5}{6}$ of $\frac{3}{7}$ by 8.                  |
| 7. Divide $\frac{3}{4}$ by 4.    | 17. Divide $\frac{3}{6}$ of $\frac{2}{5}$ by 5.                  |
| 8. Divide $\frac{2}{25}$ by 8.   | 18. Divide $\frac{4}{7}$ of $\frac{3}{4}$ by $\frac{1}{2}$ of 2. |
| 9. Divide $\frac{3}{14}$ by 10.  | 19. Divide $\frac{3}{7}$ of $\frac{2}{5}$ by $\frac{4}{9}$ of 9. |
| 10. Divide $\frac{15}{16}$ by 9. | 20. Divide $\frac{6}{5}$ of $\frac{2}{9}$ by $\frac{2}{3}$ of 3. |

When the dividend is a mixed number.

21. Divide  $4\frac{1}{3}$  by 6.

Rule.

*Reduce the mixed number to an improper fraction, and then divide as before.*

OPERATION.

$$4\frac{1}{3} = \frac{13}{3}.$$

$$\frac{13}{3} \div 6 = \frac{13}{18}.$$

22. Divide  $2\frac{3}{7}$  by 3.

23. Divide  $6\frac{4}{5}$  by 5.

24. Divide  $7\frac{2}{3}$  by 6.

25. Divide  $3\frac{1}{7}$  by 5.

26. Divide  $7\frac{2}{2}$  by 8.

27. Divide  $3\frac{4}{4}$  by 9.

28. Divide  $18\frac{2}{5}$  by 7.

29. Divide  $3\frac{1}{10}$  by 16.

30. Divide  $5\frac{6}{11}$  by 12.

31. Divide  $19\frac{1}{5}$  by 8.

32. Divide  $6\frac{2}{5}$  by 9.

33. Divide  $8\frac{1}{4}$  by 15.

34. How many barrels of flour can be bought for  $60\frac{3}{4}$  dollars, at 6 dollars a barrel?

35. If a suit of clothes requires 5 yards of cloth, how many suits may be cut from a piece of  $35\frac{1}{4}$  yards?

36. If  $25\frac{1}{3}$  dollars be equally divided among 4 persons, how much will each receive?

37. If James earns  $37\frac{1}{2}$  cents in 9 hours, how many cents does he earn in 1 hour?

#### CASE II.

88. To divide a whole number by a fraction.

1. Divide 6 by  $\frac{3}{4}$ .

Rule.—*Invert the terms of the divisor, and multiply the whole number by the new fraction.*

OPERATION.

$$6 \div \frac{3}{4} = \frac{6 \times 4}{3} = \frac{24}{3} = 8.$$

#### Examples.

1. Divide 5 by  $\frac{3}{4}$ .

2. Divide 9 by  $\frac{2}{3}$ .

3. Divide 12 by  $\frac{1}{6}$ .

4. Divide 8 by  $\frac{3}{7}$ .

5. Divide 7 by  $\frac{4}{9}$ .

6. Divide 14 by  $\frac{9}{10}$ .

7. Divide 18 by  $\frac{11}{11}$ .

8. Divide 16 by  $\frac{4}{6}$ .

9. Divide 15 by  $\frac{4}{7}$ .

10. Divide 20 by  $\frac{5}{5}$ .

11. Divide 18 by  $\frac{2}{9}$ .

12. Divide 28 by  $\frac{6}{5}$ .

13. Divide 30 by  $\frac{2}{3}$  of  $\frac{7}{8}$ .

14. Divide 16 by  $\frac{3}{5}$  of  $\frac{1}{6}$ .

15. Divide 18 by  $\frac{3}{5}$  of  $\frac{2}{3}$ .

16. Divide 17 by  $\frac{3}{8}$  of  $\frac{8}{5}$ .

17. How many gallons of molasses, at  $\frac{3}{8}$  of a dollar per gallon, can be bought for 7 dollars?

18. Suppose a boy earns  $\frac{9}{10}$  of a dollar per day: in how many days will he earn 12 dollars?

19. If an arithmetic costs  $\frac{7}{20}$  of a dollar, how many can be bought for 21 dollars?

If the divisor is a mixed number, reduce it to an improper fraction, and divide as before.

20. Divide 5 by  $7\frac{1}{4}$ .

21. Divide 7 by  $9\frac{1}{7}$ .

22. Divide 6 by  $8\frac{4}{5}$ .

23. Divide 10 by  $7\frac{5}{9}$ .

24. Divide 18 by  $4\frac{2}{3}$ .

25. Divide 11 by  $6\frac{2}{7}$ .

26. Divide 7 by  $5\frac{3}{4}$ .

27. Divide 21 by  $6\frac{1}{3}$ .

28. Divide 16 by  $2\frac{1}{2}$ .

29. Divide 24 by  $2\frac{1}{6}$ .

#### CASE III.

89. To divide one fraction by another.

1. Divide  $\frac{3}{4}$  by  $\frac{6}{7}$ .

Rule.—*Invert the terms of the divisor, and multiply the dividend by the new fraction.*

OPERATION.

$$\frac{3}{4} \div \frac{6}{7} = \frac{3}{4} \times \frac{7}{6} = \frac{21}{24} = \frac{7}{8}.$$

NOTE.—Cancel all common factors in every operation of fractions.

## Examples.

1. Divide  $\frac{5}{9}$  by  $\frac{3}{5}$ .
2. Divide  $\frac{6}{11}$  by  $\frac{7}{9}$ .
3. Divide  $\frac{4}{9}$  by  $\frac{11}{12}$ .
4. Divide  $\frac{8}{9}$  by  $\frac{8}{9}$ .
5. Divide  $\frac{2}{3}$  by  $\frac{7}{8}$ .
6. Divide  $\frac{5}{7}$  by  $\frac{9}{10}$ .
7. Divide  $\frac{2}{5}$  by  $\frac{7}{18}$ .
8. Divide  $\frac{4}{13}$  by  $\frac{3}{7}$ .
9. Divide  $\frac{14}{15}$  by  $2\frac{1}{2}$ .
10. Divide  $\frac{2}{7}$  of  $\frac{3}{4}$  by  $4\frac{1}{5}$ .
11. Divide  $8\frac{1}{3}$  by  $\frac{3}{4}$ .
12. Divide  $6\frac{1}{3}$  by  $\frac{7}{8}$ .
13. Divide  $\frac{3}{4}$  of  $\frac{7}{9}$  by  $2\frac{1}{2}$ .
14. Divide  $\frac{3}{7}$  of  $\frac{1}{3}$  by  $3\frac{1}{2}$ .
15. Divide  $\frac{1}{3}$  of  $\frac{3}{4}$  by  $\frac{1}{6}$ .
16. Divide  $\frac{9}{8}$  of 3 by  $4\frac{1}{6}$ .
17. Divide  $3\frac{1}{3}$  by  $5\frac{1}{2}$ .
18. Divide  $2\frac{1}{5}$  by  $3\frac{3}{7}$ .
19. Divide  $9\frac{1}{3}$  by  $3\frac{1}{2}$ .
20. Divide  $6\frac{2}{3}$  by  $5\frac{1}{5}$ .
21. At  $\frac{3}{4}$  of a dollar per gallon, how many gallons of molasses may be bought for  $5\frac{3}{5}$  dollars?
22. In how many months can Samuel save  $10\frac{1}{2}$  dollars, if he saves  $\frac{5}{8}$  of a dollar per month?
23. How much flour can be bought for  $\frac{9}{10}$  of a dollar, if one barrel costs  $6\frac{1}{4}$  dollars?
24. A laborer owes  $6\frac{2}{5}$  dollars: how many days, at  $1\frac{1}{3}$  dollars a day, must he labor to pay that debt?
25. There are  $5\frac{1}{2}$  yards in a rod: how many rods are there in  $28\frac{1}{8}$  yards?
26. By what number must  $\frac{7}{9}$  be multiplied, that the product may be  $\frac{14}{5}$ ?
27. How many times  $\frac{6}{11}$  are equal to  $\frac{5}{12}$ ?
28. If a ton of coal costs  $6\frac{6}{25}$  dollars, how much can be bought for  $\frac{1}{5}$  of a dollar?
29. How much silk can be bought for  $\frac{1}{2}$  of a dollar, if one yard costs  $\frac{1}{8}$  of a dollar?

## Examples in the preceding Rules.

1. What is the sum of  $4\frac{1}{3}$ ,  $6\frac{7}{8}$ , and  $5\frac{3}{7}$ ?
2. What is the sum of  $9\frac{1}{2}$ ,  $4\frac{6}{11}$ , and  $\frac{1}{12}$ ?
3. If James pays  $\frac{3}{4}$  of a dollar for a penknife, and  $\frac{2}{3}$  of a dollar for an algebra, what does he pay for both?
4. A merchant cut off, for a customer,  $3\frac{1}{7}$  yards of cloth from one piece,  $6\frac{1}{7}$  yards from another, and  $5\frac{3}{4}$  yards from a third piece: how much did he cut off in all?
5. Mr. Jones gave John  $4\frac{7}{8}$  dollars, and to Charles half that sum: how much more had John than Charles?
6. What is the difference between  $5\frac{4}{5}$  and  $3\frac{5}{11}$ ?
7. If I pay  $250\frac{7}{11}$  dollars for a horse, and  $175\frac{4}{15}$  dollars for a wagon, how much more do I pay for the horse than for the wagon?
8. If 1 dollar will buy  $\frac{3}{7}$  of a cord of wood, how much will 12 dollars buy?
9. What will  $2\frac{1}{2}$  pounds of tea cost, if 1 pound costs  $\frac{9}{10}$  of a dollar?
10. If a family consume  $8\frac{4}{7}$  barrels of flour in 1 year, how much will they consume in  $2\frac{1}{2}$  years?
11. If I own  $\frac{3}{7}$  of a farm, and sell  $\frac{5}{8}$  of it, what part of it have I left?
12. At  $\frac{5}{9}$  of a dollar a pound, what will be the cost of  $2\frac{1}{5}$  pounds of tea?
13. If a knife costs  $\frac{3}{4}$  of a dollar, and a slate  $\frac{3}{8}$  as much, what is the difference of their cost?
14. If  $\frac{3}{5}$  of  $\frac{2}{3}$  of a dollar will pay for 1 pound of tea, what will be the cost of  $5\frac{7}{9}$  pounds?
15. What will  $12\frac{5}{9}$  cords of wood cost, at  $3\frac{2}{5}$  dollars a cord?
16. If 8 yards of ribbon cost  $\frac{6}{7}$  of a dollar, what will 1 yard cost?

17. If 10 men consume  $15\frac{3}{7}$  pounds of meat in 1 day, how much will 1 man consume?

18. If Charles walks 15 miles in  $\frac{3}{5}$  of a day, how far can he walk in 1 day?

19. If the dividend is  $\frac{25}{16}$  and the divisor  $6\frac{1}{3}$ , what is the quotient?

20. If 29 bushels of wheat cost  $29\frac{3}{7}$  dollars, what will be the cost of 1 bushel?

21. If  $\frac{7}{9}$  of a ton of hay is worth  $15\frac{1}{3}$  dollars, what is the value of 1 ton?

22. If a bushel of apples costs  $\frac{4}{5}$  of a dollar, and was sold for  $\frac{7}{8}$  of a dollar, what would be the gain on 6 bushels?

23. If a mechanic received  $12\frac{3}{5}$  dollars per week, and paid  $3\frac{1}{2}$  dollars for board, how much will he save in 5 weeks?

24. What is the difference of  $3\frac{1}{2}$  times  $\frac{5}{6}$ , and  $\frac{2}{3}$  times  $4\frac{1}{4}$ ?

25. One man earns  $1\frac{3}{8}$  dollars in a day, and another earns  $1\frac{3}{4}$  dollars: how much do both earn in 3 days?

26. If a person pays  $\frac{3}{8}$  of a dollar per yard for linen, and sells it for  $\frac{4}{7}$  of a dollar per yard, how much would he gain on 3 yards?

27. From the sum of  $\frac{6}{7}$  and  $\frac{9}{10}$  take  $\frac{5}{6}$ , and multiply the remainder by  $\frac{2}{9}$ : what will be the result?

28. If sugar costs  $\frac{1}{10}$  of a dollar a pound, coffee  $\frac{2}{5}$  of a dollar, and tea  $\frac{7}{8}$  of a dollar, what will be the total cost of 7 pounds of each?

29. If a pair of pantaloons requires  $2\frac{1}{2}$  yards of cloth, and a vest  $\frac{7}{8}$  of a yard, how much will be left from a piece of 35 yards, after cutting off 3 suits?

30. How much of 50 dollars was left, after paying John for 16 days' work, at  $1\frac{1}{2}$  dollar per day, and William for 15 days' work, at  $\frac{7}{8}$  of a dollar per day?

## DECIMAL FRACTIONS.

90. A DECIMAL FRACTION is one in which the unit is divided into *tenths*, *hundredths*, *thousandths*, &c.

When the unit is divided into 10 equal parts, there are 10 such parts of the unit, and each part is called, *one-tenth*.

If each tenth be divided into 10 equal parts, there will be 100 equal parts of the unit, and each part will be  $\frac{1}{10}$  of  $\frac{1}{10} = \frac{1}{100}$ .

If each hundredth be divided into 10 equal parts, there will be 1000 equal parts of the unit, and each part will be  $\frac{1}{10}$  of  $\frac{1}{100} = \frac{1}{1000}$ ; and smaller parts may be obtained, by dividing continually by 10.

## Notation and Numeration.

91. A period (.), called the *decimal point*, written before a figure, denotes the decimal division of the unit:

Thus, .1	is read,	1 tenth	= $\frac{1}{10}$ .
.4	"	4 tenths	= $\frac{4}{10}$ .
.7	"	7 tenths	= $\frac{7}{10}$ .
&c.,			&c.

The second place from the decimal point, is the place of *hundredths*:

Thus, .01	is read,	1 hundredth	= $\frac{1}{100}$ .
.04	"	4 hundredths	= $\frac{4}{100}$ .
.07	"	7 hundredths	= $\frac{7}{100}$ .
&c.,			&c.