

## **Chapter One**

### **Multiplication**

1. Do the following multiplications:

- (i)  $439 \times 236$  (ii)  $528 \times 911$  (iii)  $867 \times 452$  (iv)  $405 \times 201$  (v)  $4545 \times 976$   
(vi)  $7985 \times 459$  (vii)  $1246 \times 452$  (viii)  $4005 \times 350$  (ix)  $9080 \times 203$  (x)  $7000 \times 400$

2. Do the following multiplications using easier method:

- (i)  $999 \times 23$  (ii)  $990 \times 75$  (iii)  $900 \times 78$  (iv)  $9900 \times 47$  (v)  $9990 \times 236$   
(vi)  $101 \times 91$  (vii)  $110 \times 32$  (viii)  $1100 \times 213$  (ix)  $1010 \times 425$  (x)  $1100 \times 900$

3. Do the following word problems:

(i) 234 folders each folder has 505 sheets of paper inside them. How many sheets of paper are there altogether?

(ii) A carton holds 4508 packets of biscuits. Each packet has 36 biscuits. How many biscuits are there in total?

(iii) A book costs tk 367. How much will be paid for 102 such books?

(iv) The monthly salary of a man is tk 2,865. What is his annual income by salary?

(v) A chair costs tk 1452 and a table costs tk 3550. What will be the cost of 18 chairs and 27 tables?

## **Chapter Two**

### **Division**

1. Do the following divisions:

- (i)  $45954 \div 45$  (ii)  $59742 \div 121$  (iii)  $81042 \div 462$  (iv)  $44002 \div 898$  (v)  $54150 \div 570$   
(vi)  $34506 \div 807$  (vii)  $77774 \div 223$  (viii)  $85055 \div 550$  (ix)  $90900 \div 303$  (x)  $49000 \div 70$

2. Do the following divisions using easier method:

- (i)  $4654 \div 10$  (ii)  $59624 \div 100$  (iii)  $42040 \div 100$  (iv)  $64455 \div 1000$  (v)  $45602 \div 1000$

3. Do the following word problems:

(i) Tk 79806 are distributed equally among 94 men. How much money will each person get?

(ii) If 58975 kg of wheat is packed in 86 bags, how much wheat will each bag contain and how much wheat will be remained?

(iii) How many hours are there in 28080 minutes?

(iv) A bus can hold 108 passengers. If there are 44820 passengers on a city, how many buses are needed to carry them?

(v) Mamun baked 1905 cookies and divided them equally into 30 packs. How many cookies did Mark put in each packet?

### Chapter Three

#### Four Rules Problems

1. Do the following simplifications:

(i)  $[12 + \{7 - (8 \div 2)\}] \times 3$

(ii)  $14 + [22 - \{8 + (6 \div 2)\}]$

(iii)  $[(56 \div 8) + \{(45 + 3 \times 5) \div 10 - 3 \times (39 \div 13 - 2)\}] \div 5$

(iv)  $4 + \{(6 \times 5 \div 2) + 5\} - 14$

(v)  $(59 - 5) \div 9 + \{(3 \times 4 + 23) \div 5\} \times 2$

2. Do the following word problems:

(i) 6 people went to a furniture shop, bought 6 Almirahs, 12 Tables, 24 Chairs and shared the payment equally among them. If the price of each almirah, table and chair is 9500tk, 3250 tk and 1325 tk respectively, how much taka would each person pay?

(ii) Mina and Raju together have 8550 tk. Mina has 790 tk more than Raju. How much money does Mina and Raju each have?

(iii) The sum of the age of grandfather and grandchild is 90 years. Grandfather's age is nine times of his grandchild. What are their ages?

(iv) Dividend is 32390, the quotient is 689 and the remainder is one-fourth of 28. What is the divisor?

#### Unitary Method:

(v) A mobile company can produce 3585 mobiles in 3 weeks. How many mobiles can it produce in 7 weeks?

(vi) Abir bought 15 notepads at 750 tk. How much money is needed for 12 notepads?

(vii) The price of 14 kg wheat is 420 tk. Then how much wheat can you buy by 1650 tk?

(viii) A bike can travel 625 km by 25 litres of petrol. How many litres of petrol is needed to travel 150 km?

## Chapter 4

### Mathematical Symbols

1. Express the following sentences in mathematical sentences and identify open and mathematical sentences.

(i) Multiplying 13 by 11 equals 144.

(ii) Adding  $x$  with 43 equals 54.

(iii) Dividing 56 by 8 is equal to 7.

(iv) Subtracting 22 from 87 makes 65

(v) Putting  $x$  and  $y$  together creates 20

2. Find the value of  $x$  from the following equations:

(i)  $x+13=20$  (ii)  $x-33=7$  (iii)  $5 \times x=45$  (iv)  $x \div 11=121$  (v)  $(x-6) \div 9 = 3$

3. A bottle of juice weights 250 grams. There are many bottles of this juice in a box of 90 grams. Let  $x$  denotes the number of bottles and  $y$  is the sum of weights of all juice bottles and weight of box.

(i) Write a mathematical sentence to show the relationship between  $x$  and  $y$ .

(ii) Find the value of  $y$  when  $x$  is 12.

(iii) Find the value of  $x$  when  $y$  is 840.

## Chapter 5

### Multiples and Factors

1. Find the multiples and factors of the following numbers:

(i) 5 (ii) 8 (iii) 11 (iv) 12 (v) 14 (vi) 18 (vii) 24 (viii) 28 (ix) 32 (x) 36

2. Find the GCF:

(i) 5, 25 (ii) 4, 12, 15 (iii) 18, 28 (iv) 3, 9, 18 (v) 36, 63 (vi) 9, 12, 18, 24

3. Find the LCM:

(i) 6, 15 (ii) 9, 16 (iii) 10, 18, 25 (iv) 8, 14, 15, 18 (v) 21, 35 (vi) 5, 12, 20, 27

4. Find the prime numbers within 1-100.

5. There are some tiles whose length is 9 cm and width is 7 cm. We want to make a square by setting them on the floor. Find the length of a side of the smallest square and also find the number of necessary tiles to make the square.

6. There is a graph paper of 24 cm in width and 36 cm in length. We cut this paper into some squares of the same size without leaving any remaining parts. Find the length of a side of the largest square and how many squares of the largest size can we make?

## Chapter 6

### Fractions

1. Write proper, improper and mixed fractions. (20 each)

Then change the improper into mixed and mixed into improper fractions.

2. Do the addition of the following fractions:

$$(i) \frac{8}{13} + \frac{7}{13} \quad (ii) \frac{6}{5} + \frac{6}{10} \quad (iii) \frac{5}{12} + \frac{7}{9} \quad (iv) \frac{13}{15} + 2\frac{7}{15} \quad (v) 1\frac{4}{9} + \frac{14}{18} \quad (vi) 3\frac{9}{10} + 2\frac{11}{16} \quad (vii) \frac{3}{14} + 1\frac{5}{7} + \frac{7}{21}$$

3. Do the subtraction of the following fractions:

$$(i) \frac{3}{5} - \frac{4}{5} \quad (ii) \frac{17}{12} - \frac{14}{16} \quad (iii) 1\frac{13}{15} - \frac{12}{25} \quad (iv) 2\frac{4}{9} - 1\frac{5}{12} \quad (v) \frac{11}{15} - 1\frac{3}{5} \quad (vi) 2\frac{2}{3} - \frac{3}{14} + \frac{2}{7}$$

Class – 5

Subject – Mathematics

Chapter – 6

Fraction

**Fraction:** A fraction simply tells us how many parts of a whole we have. You can recognize a fraction by the slash that is written between the two numbers. We have a top number, the **numerator**, and a bottom number, the **denominator**.

Example:  $\frac{1}{2}$  is a fraction. Here ‘1’ is the numerator and ‘2’ is the denominator.

**Types of fractions:** There are three types of fraction. They are:

1. Proper Fraction.
2. Improper Fraction.
3. Mixed Fraction.

1) **Proper Fraction:** Fractions that are greater than 0 but less than 1 are called proper fractions. In proper fractions, the numerator is less than the denominator.

Example:  $\frac{3}{4}$ ,  $\frac{1}{2}$ ,  $\frac{4}{5}$ ,  $\frac{6}{11}$  etc.

2) **Improper Fraction:** when a fraction has a numerator that is greater than or equal to the denominator, the fraction is an improper fraction. An improper fraction is always equal to 1 or greater than 1.

Example:  $\frac{8}{5}$ ,  $\frac{4}{3}$ ,  $\frac{4}{4}$ ,  $\frac{1}{1}$  etc.

3) **Mixed Fraction:** A whole number and a fraction combined into one mixed fraction.

Example:  $1\frac{1}{2}$ ,  $1\frac{3}{4}$ ,  $7\frac{3}{4}$  etc.

Proper Fraction	Improper Fraction	Mixed fraction
Numerator < Denominator	Numerator > Denominator	Integer + Proper Fraction
Greater than 0, Smaller than 1.	Greater than 1, Equal to 1.	Greater than 1, Equal to 1.

### Book Exercise:

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1. Find proper fractions and fractions equal to 1 in the box.

$\frac{2}{3}$	$\frac{4}{4}$	$\frac{5}{8}$	$\frac{13}{12}$	$\frac{27}{26}$	$\frac{1}{1}$	$\frac{2}{25}$
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Solution: Proper Fractions:  $\frac{2}{3}$ ,  $\frac{5}{8}$ ,  $\frac{2}{25}$

Fraction equal to 1:  $\frac{4}{4}, \frac{1}{1}$

2. Arrange the following from smaller to larger and show it by symbols.

i)  $\frac{6}{7}, \frac{3}{7}, \frac{7}{7}, \frac{2}{7}$

ii)  $\frac{2}{7}, \frac{2}{5}, \frac{2}{4}, \frac{2}{2}$

Solution: i)  $\frac{2}{7} < \frac{3}{7} < \frac{6}{7} < \frac{7}{7}$

ii)  $\frac{2}{7} < \frac{2}{5} < \frac{2}{4} < \frac{2}{2}$

3. Find the mission numbers.

1)  $\frac{1}{3} = \frac{\square}{6}$ , 2)  $\frac{4}{5} = \frac{12}{\square}$ , 3)  $\frac{3}{6} = \frac{\square}{2}$ , 4)  $\frac{12}{54} = \frac{2}{\square}$

Solution:

1)  $\frac{1}{3} = \frac{\square}{6}$

or,  $3 \times \square = 1 \times 6$

or,  $3 \times \square = 6$

or,  $\square = \frac{6}{3}$

or,  $\square = 2$

Ans:  $\frac{1}{3} = \frac{2}{6}$

2)  $\frac{4}{5} = \frac{12}{\square}$

Or,  $4 \times \square = 12 \times 5$

Or,  $4 \times \square = 60$

Or,  $\square = 15$

Ans:  $\frac{4}{5} = \frac{12}{15}$

3)  $\frac{3}{6} = \frac{\square}{2}$

Or,  $6 \times \square = 3 \times 2$

Or,  $6 \times \square = \frac{6}{6}$

Or,  $\square = 1$

Ans:  $\frac{3}{6} = \frac{1}{2}$

$$4) \frac{12}{54} = \frac{2}{\square}$$

$$\text{Or, } 12 \times \square = 2 \times 54$$

$$\text{Or, } 12 \times \square = 120$$

$$\text{Or, } \square = \frac{120}{12}$$

$$\text{Or, } \square = 10$$

$$\text{Ans: } \frac{12}{54} = \frac{2}{10}$$

4) Reduce the following fractions to the lowest term.

$$1. \frac{6}{12}, 2. \frac{3}{21}, 3. \frac{8}{12}, 4. \frac{9}{15}, 5. \frac{24}{40}$$

$$\text{Solution: } 1. \frac{6}{12} = \frac{1}{2}, 2. \frac{3}{21} = \frac{1}{7}, 3. \frac{8}{12} = \frac{2}{3}, 4. \frac{9}{15} = \frac{3}{5}, 5. \frac{24}{40} = \frac{3}{5}$$

5) Convert Fractions into ones with common denominators.

$$1. \frac{1}{3}, \frac{1}{4} \quad 2. \frac{2}{3}, \frac{1}{2} \quad 3. \frac{1}{4}, \frac{2}{5}$$

Solution:

$$1. \frac{1}{3}, \frac{1}{4}$$

LCM of denominator of fractions 3 and 4 = 12.

$$12 \div 3 = 4.$$

$$1^{\text{st}} \text{ fraction} = \frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$$

$$\text{Again, } 12 \div 4 = 3$$

$$2^{\text{nd}} \text{ fraction} = \frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$$

$$\text{Ans: } \left[ \frac{1}{3}, \frac{1}{4} \right] \rightarrow \left[ \frac{4}{12}, \frac{3}{12} \right]$$

$$2. \frac{2}{3}, \frac{1}{2}$$

LCM of 3 and 2 = 6

$$6 \div 3 = 2$$

$$1^{\text{st}} \text{ fraction} = \frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

$$\text{Again, } 6 \div 2 = 3$$

$$2^{\text{nd}} \text{ fraction} = \frac{1}{2} = \frac{2 \times 2}{3 \times 2} = \frac{3}{6}$$

$$\text{Ans: } \left[ \frac{2}{3}, \frac{1}{2} \right] \rightarrow \left[ \frac{4}{6}, \frac{3}{6} \right]$$

$$3. \frac{1}{3}, \frac{2}{5}$$

$$\text{LCM of 3 and 5} = 15$$

$$15 \div 3 = 5$$

$$1^{\text{st}} \text{ fraction} = \frac{1}{3} = \frac{1 \times 5}{3 \times 5} = \frac{5}{15}$$

Again,

$$15 \div 5 = 3$$

$$2^{\text{nd}} \text{ fraction} = \frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15}$$

$$\text{Ans: } \left[ \frac{1}{3}, \frac{2}{5} \right] \rightarrow \left[ \frac{5}{15}, \frac{6}{15} \right]$$

6. Do addition and subtraction.

$$1. \frac{1}{4} + \frac{1}{3}$$

$$2. \frac{1}{3} + \frac{1}{6}$$

$$3. \frac{1}{2} - \frac{1}{3}$$

$$4. \frac{1}{2} - \frac{1}{6}$$



Solution:

$$1. \frac{1}{4} + \frac{1}{3}$$
$$= \frac{(1 \times 3) + (1 \times 4)}{12}$$

$$= \frac{3+4}{12}$$

$$= \frac{7}{12}$$

$$2. \frac{1}{3} + \frac{1}{6}$$
$$= \frac{(1 \times 2) + (1 \times 1)}{6}$$

$$= \frac{2+1}{6}$$

$$= \frac{3}{6}$$

$$= \frac{1}{3}$$

$$3. \frac{1}{2} - \frac{1}{3}$$
$$= \frac{(1 \times 3) - (1 \times 2)}{6}$$

$$= \frac{3-2}{6}$$

$$= \frac{1}{6}$$

$$4. \frac{1}{2} - \frac{1}{6}$$
$$= \frac{(1 \times 3) - (1 \times 1)}{6}$$

$$= \frac{3-1}{6}$$

$$= \frac{2}{6} = \frac{1}{3}$$

### Mixed Fraction into improper fraction:

$$4 \times 2 + 1 = \frac{9}{4}$$

- Multiply the integer part by the denominator and add it to the numerator then put the number as numerator.
- The denominator will remain same.

### Exercise (Do yourself)

Change into improper fractions:

1)  $3\frac{1}{2}$    2)  $2\frac{5}{6}$    3)  $4\frac{4}{9}$    4)  $3\frac{5}{8}$    5)  $2\frac{7}{10}$

### Improper fractions into mixed fraction:

$$9 \div 4 = 2, \text{ Remainder } 1$$
$$\frac{9}{4} = 2\frac{1}{4}$$

- Divide the numerator by the denominator.
- Write down the quotient on the integer part and remainder as the numerator.
- Denominator will remain same.

### Exercise (Do yourself):

Change into mixed fractions or integer:

1)  $\frac{7}{5}$    2)  $\frac{8}{4}$    3)  $\frac{22}{7}$    4)  $\frac{35}{8}$    5)  $\frac{40}{10}$

- There are  $\frac{3}{5} m$  and  $\frac{4}{5} m$  strings, how many meters altogether?

Solution:

$$1^{\text{st}} \text{ string} = \frac{3}{5}m$$

$$2^{\text{nd}} \text{ string} = \frac{4}{5}m$$

$$\text{All together} = \left(\frac{3}{5} + \frac{4}{5}\right) m$$

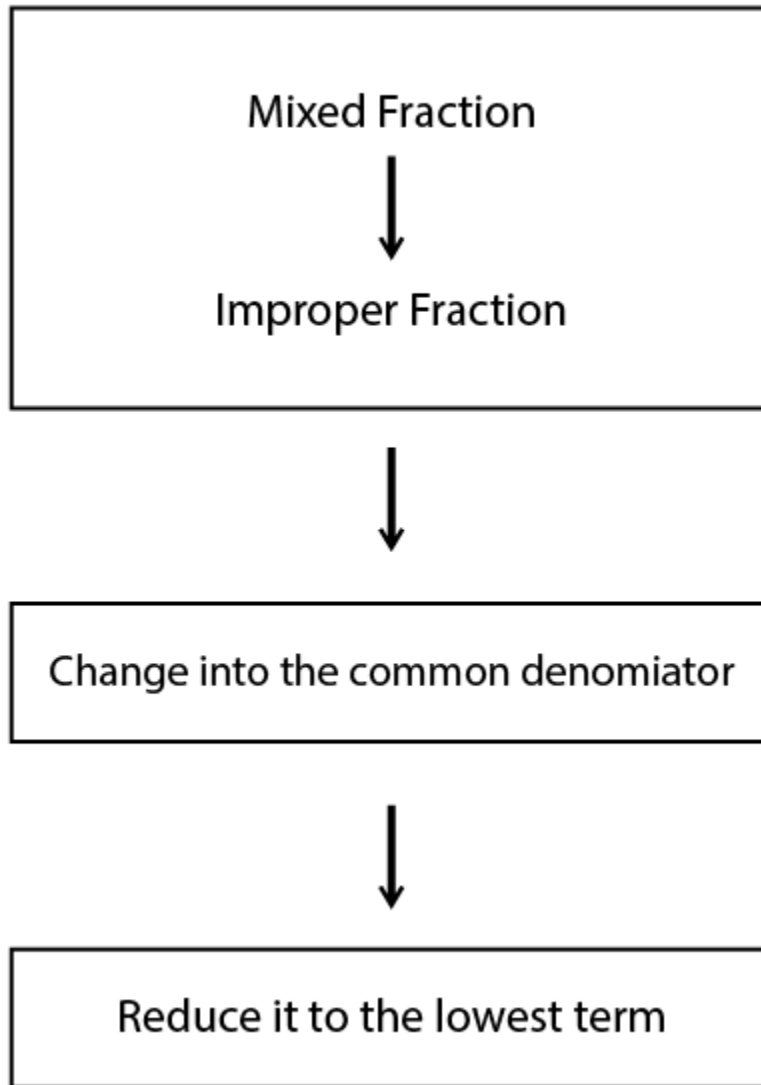
$$= \left(\frac{3+4}{5}\right) m$$

$$= \frac{7}{5} m$$

$$= 1\frac{2}{5}m$$

Calculate:

1)  $\frac{4}{5} + \frac{4}{5}$    2)  $\frac{13}{9} + \frac{6}{9}$    3)  $\frac{9}{7} - \frac{6}{7}$    4)  $\frac{17}{8} - \frac{9}{8}$    5)  $1\frac{1}{5} + \frac{1}{5}$    6)  $\frac{4}{5} + 1\frac{3}{5}$   
 7)  $1\frac{3}{7} - \frac{4}{7}$    8)  $2\frac{4}{9} - \frac{5}{9}$    9)  $3 - \frac{2}{3}$    10)  $1\frac{3}{7} - \frac{4}{7}$



Calculation:

$$1) 2\frac{1}{3} + 1\frac{1}{6}$$

$$= \frac{7}{3} + \frac{7}{6}$$

$$= \frac{14+7}{6}$$

$$= \frac{21}{6}$$

$$= \frac{7}{2}$$

$$= 3\frac{1}{2}$$

$$2) 1\frac{2}{3} + \frac{5}{8} - 1\frac{1}{6}$$

$$= \frac{5}{3} + \frac{5}{8} - \frac{7}{6}$$

$$= \frac{(5 \times 3) + (5 \times 1) - (7 \times 4)}{24}$$

$$= \frac{40 + 15 - 28}{24}$$

$$= \frac{55 - 28}{24}$$

$$= \frac{27}{24}$$

$$= \frac{9}{8}$$

$$= 1\frac{1}{8}$$

Calculate (Do yourself):

$$1) \frac{1}{3} + 1\frac{2}{9} + \frac{1}{6}$$

$$2) 2\frac{7}{2} - \frac{1}{6} - \frac{1}{9}$$

$$3) 1\frac{7}{8} - \frac{3}{8} + \frac{1}{10}$$

**Exercise 6(a)**  
**Page – 44 (Book)**  
**Do yourself**



Class – 5

Subject – Mathematics

Chapter – 6

Fraction

Part – 2

Multiplication by Integers

$$\frac{2}{7} \times 3 = \frac{2 \times 3}{7} = \frac{6}{7}$$

- When we multiply a fraction by an integer, keep the denominator and multiply the numerator by the integer.

$$1. \frac{5}{12} \times 6 = \frac{5 \times 6}{12} = \frac{30}{12} = \frac{5}{2} = 2 \frac{1}{2}$$

OR,

$$\frac{5}{12} \times 6 = \frac{5 \times 6}{12} = \frac{5}{2} = 2 \frac{1}{2}$$

2. 1dl of paint covers  $\frac{3}{4} m^2$  of a board. How many  $m^2$  can be painted with 4 dl?

Solution:

1dl of paint covers  $\frac{3}{4} m^2$  of a board

∴ 4dl of paint covers  $(\frac{3}{4} \times 4) m^2$  of a board

$$= \frac{3 \times 4}{4} m^2 \text{ of a board}$$

$$= 3 m^2 \text{ of a board}$$

3.  $\frac{2}{7}$  kilogram of sugar needed to make one pot payesh. How many kilograms of is needed to make 14 pot payesh?

Solution:

1 pot of payesh needed sugar  $\frac{2}{7}$  kg

∴ 14 Pot payesh needed sugar  $(\frac{2}{7} \times 14)$  kg

$$= \frac{2 \times 14}{7} \text{ kg}$$

$$= 4 \text{ kg}$$

## Multiplication by fraction

When we multiply with fraction, multiply the numerators by numerators and denominators by denominators.

$$\frac{\text{○}}{\text{□}} \times \frac{\text{△}}{\text{◇}} = \frac{\text{○} \times \text{△}}{\text{□} \times \text{◇}}$$

### Example:

$$1) \frac{4}{5} \times \frac{2}{3} = \frac{4 \times 2}{5 \times 3} = \frac{8}{15}$$

$$2) 1 \frac{1}{2} \times 1 \frac{2}{5}$$

$$= \frac{3}{2} \times \frac{7}{5}$$

$$= \frac{3 \times 7}{2 \times 5}$$

$$= \frac{21}{10}$$

$$= 2 \frac{1}{10}$$

$$3) \frac{8}{9} \times \frac{3}{4} = \frac{8 \times 3}{9 \times 4} = \frac{24}{36} = \frac{2}{3}$$

Or,

$$\frac{8}{9} \times \frac{3}{4} = \frac{8 \times 3}{9 \times 4} = \frac{2}{3}$$

$$4) \frac{3}{4} \times \frac{10}{6} \times \frac{2}{5} = \frac{3 \times 10 \times 2}{4 \times 6 \times 5} = \frac{2}{2 \times 2} = \frac{1}{2}$$

### Exercise (Do yourself)

$$1) \frac{5}{6} \times \frac{12}{25} \quad 2) \frac{3}{2} \times \frac{8}{15} \quad 3) \frac{7}{13} \times \frac{13}{7} \quad 4) \frac{20}{26} \times \frac{52}{10} \quad 5) \frac{2}{3} \times \frac{1}{5} \times \frac{3}{4} \quad 6) \frac{7}{12} \times \frac{1}{3} \times \frac{3}{14}$$

$$7) \frac{7}{15} \times \frac{5}{6} \times \frac{3}{14} \quad 8) \frac{2}{21} \times \frac{45}{3} \times \frac{7}{15}$$

### Word Problem:

1) Find the area of a rectangular piece of board with  $\frac{4}{5}m$  long and  $\frac{2}{3}m$  width.

Solution:

Given,

$$\text{Length} = \frac{4}{5}m$$

$$\text{Width} = \frac{2}{3}m$$

We know,

$$\begin{aligned}\text{Area of rectangle} &= \text{Length} \times \text{Width} \\ &= \left(\frac{4}{5} \times \frac{2}{3}\right)m^2 \\ &= \left(\frac{4 \times 2}{5 \times 3}\right)m^2 \\ &= \frac{8}{15}m^2\end{aligned}$$

2) Find the area of a rectangular piece of board with  $1\frac{3}{4}m$  long and  $1\frac{1}{5}m$  width.

Solution:

Given,

$$\text{Length} = 1\frac{3}{4} = \frac{7}{4}m$$

$$\text{Width} = 1\frac{1}{5} = \frac{6}{5}m$$

We know,

$$\begin{aligned}\text{Area of rectangle} &= \text{Length} \times \text{width} \\ &= \left(\frac{7}{4} \times \frac{6}{5}\right)m^2 \\ &= \left(\frac{7 \times 6}{4 \times 5}\right)m^2 \\ &= \frac{21}{20}m^2 \\ &= 2\frac{1}{10}m^2\end{aligned}$$

3) Find the area of a square piece of land with  $2\frac{1}{2}km$  sides.

Solution:



Given,

$$\begin{aligned}\text{Side of a square} &= 2\frac{1}{2}km \\ &= \frac{5}{2}km\end{aligned}$$

We know,

$$\begin{aligned}\text{Area of square} &= \text{side} \times \text{side} \\ &= \left(\frac{5}{2} \times \frac{5}{2}\right) km^2 \\ &= \frac{25}{4} km^2 \\ &= 6\frac{1}{4} km^2\end{aligned}$$

### “Of” in mathematics

In our country “of” is sometimes used as a kind of symbols as follows

- The green Part is  $\frac{1}{2}$  of 1
- **“Of” is the same meaning of “×”, and calculation with “of” should be done before any other operations (×, ÷, +, -).**

#### **Example:**

1)  $6 \div 3 \times 2$  of 4

$$= 6 \div 3 \times 8$$

$$= 2 \times 8$$

$$= 16$$

2)  $8 + \frac{1}{3}$  of  $6 \times 5$

$$= 8 + \frac{6}{3} \times 5$$

$$= 8 + 2 \times 5$$

$$= 8 + 10 = 18$$

**Reciprocal:** A number or a fraction is called the reciprocal of another number if the product of the two number is 1.

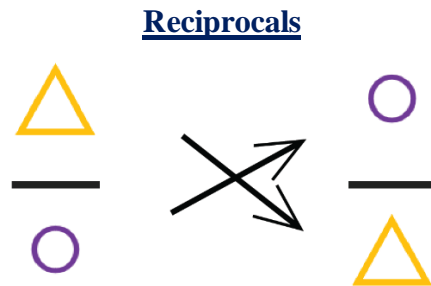
$$\diamond \frac{2}{3} \times \frac{3}{2} = 1$$

The reciprocal of  $\frac{2}{3}$  is  $\frac{3}{2}$  and the reciprocal of  $\frac{3}{2}$  is  $\frac{2}{3}$

$$\diamond \frac{5}{7} \times \frac{7}{5} = 1$$

The reciprocal of  $\frac{5}{7}$  is  $\frac{7}{5}$  and the reciprocal of  $\frac{7}{5}$  is  $\frac{5}{7}$ .

- The reciprocal of a fraction is the fraction with its numerator and denominator flipped.



Examples:

1. Reciprocal of  $\frac{7}{9}$  is  $\frac{9}{7}$
2. Reciprocal of  $\frac{1}{8}$  is 8
3. Reciprocal of 7 is  $\frac{1}{7}$

### Exercise (Do Yourself)

Write the reciprocal:

- 1)  $\frac{4}{9}$    2)  $\frac{1}{3}$    3) 11   4)  $\frac{11}{21}$    5) 5

### Division by Integers

When we divide a fraction by an integer, keep the numerator and multiply the denominator by the integer.

$$\frac{\circ}{\square} \div \triangle = \frac{\circ}{\square \div \triangle}$$

Example:

$$1) \frac{4}{5} \div 2 = \frac{4}{5 \times 2} = \frac{2}{5}$$

$$\text{Or, } \frac{4}{5} \div 2 = \frac{4}{5} \times \frac{1}{2} = \frac{2}{5}$$

$$2) \frac{10}{9} \div 8 = \frac{10}{9 \times 8} = \frac{5}{36}$$

Exercise (Do yourself):

$$1) \frac{5}{6} \div 3 \quad 2) \frac{4}{7} \div 3 \quad 3) \frac{4}{9} \div 5 \quad 4) \frac{5}{6} \div 10 \quad 5) \frac{12}{7} \div 4$$

Word Problem:

1) If  $\frac{8}{9}$  Litre of milk is distributed equally to 5 people, how many litre of milk is for one person?

Solution:

5 Persons get  $\frac{8}{9}$  L of milk

$$\begin{aligned} \therefore 1 \text{ Person get } \left(\frac{8}{9} \div 5\right) L \text{ of milk} \\ &= \left(\frac{8}{9} \times \frac{1}{5}\right) L \text{ of milk} \\ &= \frac{8}{45} L \text{ of milk} \end{aligned}$$

2) 2 dL of paint covers  $\frac{3}{5} m^2$ . How many  $m^2$  can you paint with 1dL?

Solution:

$$\begin{aligned} 2\text{dL of paint covers } \frac{3}{5} \\ \therefore 1 \text{ dL of paint covers } \left(\frac{3}{5} \div 2\right) m^2 \\ &= \left(\frac{3}{5 \times 2}\right) m^2 \\ &= \frac{3}{10} m^2 \end{aligned}$$

### Division by Fraction

When we divide of fractions, multiply the first fraction by the reciprocal of the divisor.

$$\frac{\text{○}}{\text{□}} \div \frac{\text{◇}}{\text{△}} = \frac{\text{○}}{\text{□}} \times \frac{\text{△}}{\text{◇}} = \frac{\text{○} \times \text{△}}{\text{□} \times \text{◇}}$$

Example:

$$1) \frac{3}{4} \div \frac{2}{7} = \frac{3}{4} \times \frac{7}{2} = \frac{3 \times 7}{4 \times 2} = \frac{21}{8} = 2\frac{5}{8}$$

$$2) \frac{2}{5} \div \frac{8}{15} = \frac{2}{5} \times \frac{15}{8} = \frac{4}{3} = 1\frac{1}{3}$$

$$3) \frac{7}{8} \div 4 = \frac{7}{8} \times \frac{1}{4} = \frac{7 \times 1}{8 \times 4} = \frac{7}{32}$$

$$4) 5 \div \frac{2}{3} = 5 \times \frac{3}{2} = \frac{5 \times 3}{2} = \frac{15}{2} = 7\frac{1}{2}$$

$$5) 2\frac{1}{2} \div 2\frac{5}{6} = \frac{5}{2} \div \frac{17}{6} = \frac{5}{2} \times \frac{6}{17} = \frac{15}{17}$$

Exercise (Do yourself):

$$1) \frac{8}{3} \div \frac{4}{9} \quad 2) \frac{7}{10} \div \frac{7}{12} \quad 3) \frac{7}{9} \div \frac{2}{27} \quad 4) 3 \div \frac{6}{11} \quad 5) 11 \div 2\frac{1}{4} \quad 6) 3\frac{2}{3} \div 1\frac{1}{6} \quad 7) 1\frac{5}{8} \div 2\frac{1}{3}$$

$$8) \frac{8}{5} \div \frac{1}{2}$$

- When a calculation includes both multiplication and division, we can convert the division into multiplication and solve it.

$$1) \frac{3}{4} \div \frac{6}{5} \times \frac{1}{5} = \frac{3}{4} \times \frac{5}{6} \times \frac{1}{5} = \frac{1}{4 \times 2} = \frac{1}{8}$$

$$2) \frac{2}{9} \div \frac{4}{7} \div \frac{5}{6} = \frac{2}{9} \times \frac{7}{4} \times \frac{6}{5} = \frac{1}{15}$$

Exercise (Do yourself)

$$1) \frac{2}{3} \times \frac{1}{8} \div \frac{7}{9} \quad 2) \frac{3}{8} \div \frac{3}{5} \times \frac{4}{5} \quad 3) \frac{3}{7} \times 4 \div \frac{3}{5} \quad 4) \frac{7}{15} \times \frac{5}{6} \times \frac{3}{14} \quad 5) \frac{7}{12} \div 2\frac{1}{3} \times \frac{2}{3}$$

$$6) \frac{7}{12} \times \frac{2}{5} \div 2\frac{1}{3}$$