Chapter -4

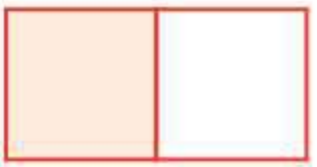
Fractions

Objectives :
1. To give knowledge about fractional part of a group to the students.
2. To give knowledge about comparison of Fractions.
3. Conversion of Fraction into decimal and decimal into fraction.
4. Importance of Fractions in daily life.

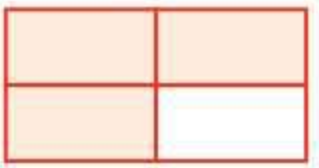
Recap

First of all we shall revise 4th class work.

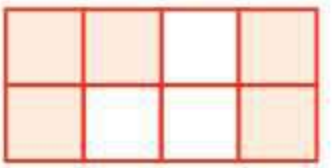
1. Write the Fraction of coloured part in the following diagrams :



(a)



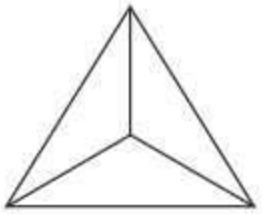
(b)



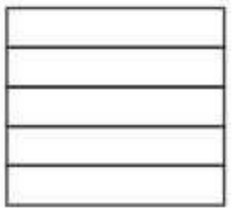
(c)

2. Colour the diagram according to given fraction :

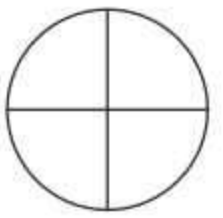
(a) $\frac{2}{3}$



(b) $\frac{3}{5}$



(c) $\frac{1}{4}$



3. In fraction $\frac{2}{3}$, numerator is ☐ and denominator is ☐.

4. In fraction $\frac{1}{2}$, numerator is ☐ and denominator is ☐.

5. Write the fraction with numerator 4 and denominator 5 : ☐

In 4th class, you have studied about fraction of a whole. Here, a whole is divided into equal parts, which is called denominator and out of these parts the special part is considered as numerator.

In this class, we will study fraction of a group.

4.1 Fraction of a group :

Here one group is considered as whole. Total quantity is considered as denominator and requirement of special parts out of total is called numerator.

Activity

Harish has 7 apples and he gives 3 apples to his friend Naresh. Since, we have talked about 7 apples, so denominator of fraction is 7 and 3 apples are given to Naresh, so numerator of fraction is 3. Now Naresh has $\frac{3}{7}$ of apples.

Example 1 : Out of the following group of stars :

(a) Make fraction of coloured stars.

(b) Make fraction of stars without colour.

Solution : (a) There are 5 stars in the group and 2 are coloured. So fraction of coloured stars is $\frac{2}{5}$.

(b) Total stars in the group are 5. Out of which 3 stars are without colour. So fraction of stars without colour is $\frac{3}{5}$.

Exercise-4.1

1. Out of the following group of stars :

(a) Write the fraction of coloured stars. ☐

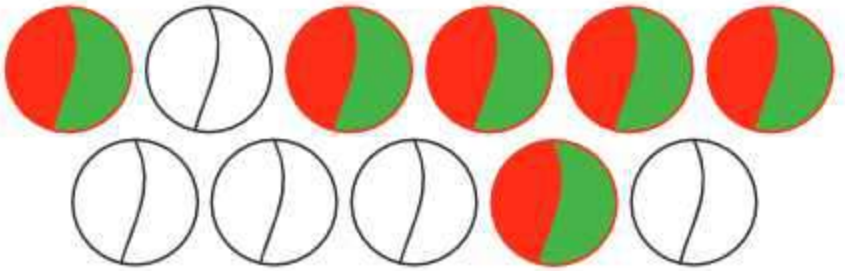
(b) Write fraction of stars without colour. ☐

2. In the following diagram :

(a) Write fraction of coloured ice creams ☐

(b) Write fraction of ice creams without colour ☐

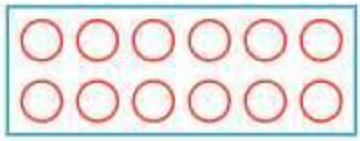
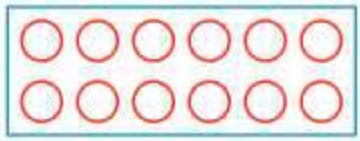
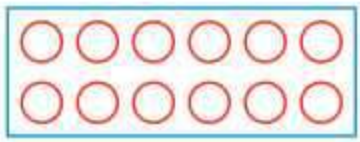
3. In the following diagram :



(a) Write fraction of coloured balls. ☐

(b) Write fraction of balls without colour. ☐

4. There are 12 balls in each of the following box.
Colour the balls according to given fraction in the box and write number of coloured balls in blank box :

	Diagrams	Fractions	No. of coloured balls
(a)		$\frac{1}{2}$	
(b)		$\frac{1}{3}$	
(c)		$\frac{1}{4}$	

4.2 Concept of Half, One third and One fourth in fraction :

We had already studied in previous classes that whole is divided into two equal parts and one part is called half and written as $\frac{1}{2}$.

Two halves make a whole

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

We have to divide a whole by two to get half of whole or group. When we ask our mother for half chapati, she divide it into two equal parts and give one part (half) to us.

Similarly, when we go to market for purchasing one dozen bananas then we get 12 bananas. But when we buy half of a dozen then we have 6 bananas. Because $12 \div 2 = 6$

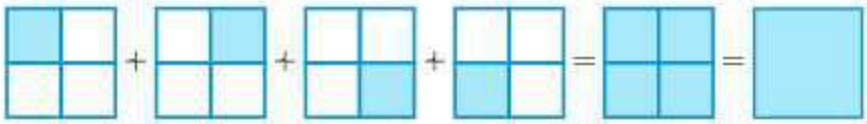
One third : When a whole or a group is divided into 3 equal parts then one part is called one-third of a whole and written as $\frac{1}{3}$.

Three one third make a whole

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

One-fourth : When a whole is divided into four equal parts then one part is called one-fourth and written as $\frac{1}{4}$.

Four, one Fourth make a whole.



$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4} = 1$

$\frac{1}{4}$ of 12 bananas = $12 \div 4 = 3$ bananas

Similarly for getting $\frac{2}{3}$ of a whole or group we divide by 3 and multiply by 2.

For example $\frac{2}{3}$ of 12 bananas : $12 \div 3 = 4$ and $4 \times 2 = 8$ bananas.

Similarly for getting $\frac{3}{4}$ of a whole or group, we divide by 4 and multiply by 3.

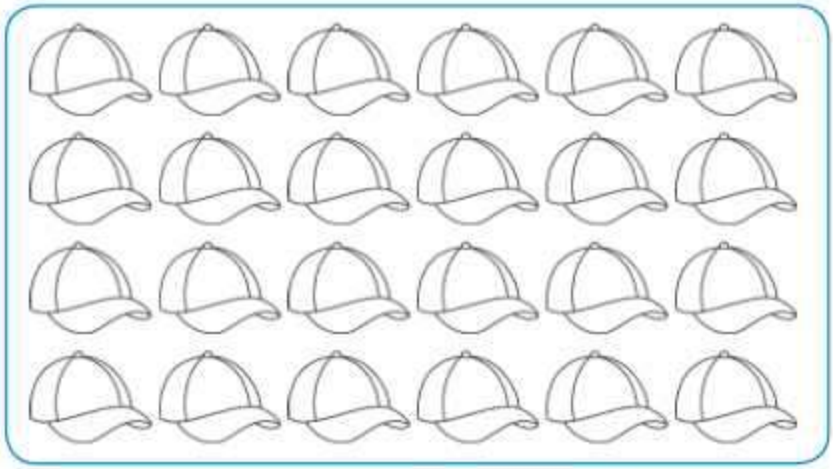
For example : $\frac{3}{4}$ of 12 bananas : $12 \div 4 = 3$ and $3 \times 3 = 9$ bananas.

Example 1 : Raju had birthday party. His father brought 24 caps for invited children. Out of these $\frac{1}{3}$ are red, $\frac{1}{2}$ are green and $\frac{1}{6}$ are yellow caps. Then

(a) How many children will have red coloured caps ?

(b) How many children will have green coloured caps ?

(c) How many children will have yellow coloured caps ?



Solution : (a) Total caps $= 24$

Fraction of red coloured caps $= \frac{1}{3}$

Number of red coloured caps $= 24 \div 3 = 8$

So, 8 children will have red coloured caps.

(b) Total caps $= 24$

Fraction of Green caps $= \frac{1}{2}$

Number of Green caps $= 24 \div 2 = 12$

So, 12 children will have green caps.

(c) Fraction of yellow caps $= \frac{1}{6}$

Number of yellow caps $= 24 \div 6 = 4$

So, 4 children will have yellow caps.

Hint for the Teacher The teacher will tell the children to colour the caps with red, green and yellow colours.

Exercise-4.2

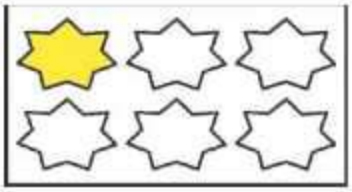
1. Match the following :

(a) 

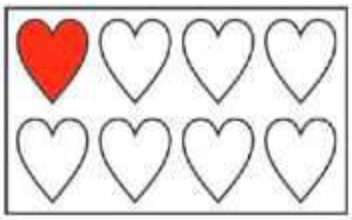
$\frac{1}{4}$ One-eighth

(b) 

$\frac{2}{3}$ One-fourth

(c) 

$\frac{1}{2}$ One-third

(d) 

$\frac{1}{6}$ Half

(e) 

$\frac{1}{8}$ One-sixth

(f) 

$\frac{1}{3}$ Two-third

2. Match the following :

(a)	$\frac{1}{10}$	(i)	One-fourth
(b)	$\frac{1}{2}$	(ii)	Half
(c)	$\frac{1}{4}$	(iii)	One-third
(d)	$\frac{1}{8}$	(iv)	One-sixth
(e)	$\frac{1}{6}$	(v)	One-tenth
(f)	$\frac{1}{3}$	(vi)	One-eighth

3. Fill in the blanks :

(a) $\frac{1}{3}$ part of 9 guavas = ☐ guavas

(b) $\frac{1}{6}$ part of 12 toffees = ☐ toffees

(c) $\frac{1}{6}$ part of 18 ice-creams = ☐ ice-creams

(d) $\frac{1}{4}$ part of 16 pencils = ☐ pencils

(e) $\frac{1}{10}$ part of ₹ 20 = ₹ ☐

(f) $\frac{1}{10}$ part of 100 pencils = ☐ pencils

(g) $\frac{1}{10}$ part of 100 cm = ☐ cm

(h) $\frac{1}{8}$ part of 32 laddoos = ☐ laddoos

4. Neha's uncle brought a big chocolate which looks as following diagram:

4.3 Comparison of Equivalent Fractions :

In previous class, we have learnt that we use a multiples of numerator and denominator in forming equivalent fractions. For example, Equivalent fractions of $\frac{3}{4}$ are $\frac{6}{8}, \frac{9}{12}, \frac{12}{16}$, ... etc.

Similarly, if we have to find that two fractions are equal or not, then we use multiplication as follows :

Cross multiply numerator of first fraction with the denominator of second fraction and denominator of first fraction with numerator of second fraction. If product of both cases are equal then fraction is equivalent fraction.

Example : To find $\frac{1}{3}$ and $\frac{3}{9}$ are equivalent or not.

Solution : Numerator and denominator of $\frac{1}{3}$ are 1 and 3 respectively.

Numerator and denominator of $\frac{3}{9}$ are 3 and 9 respectively.

Now, $\frac{1}{3} \times \frac{3}{9}$

(Numerator of first fraction) × (Denominator of second fraction) = $1 \times 9 = 9$

or $9 \times 1 = 9$

and (Denominator of first fraction) × Numerator of second fraction)

$= 3 \times 3 = 9$

Both the products are equal.

So, fractions are equivalent fractions.

Example 1 : Check $\frac{2}{3}$ and $\frac{4}{9}$ are equivalent fractions ?

Solution : (Numerator of first fraction) × (Denominator of second fraction)

$= 2 \times 9 = 18$

and

(Denominator of first fraction)×(Numerator of second fraction)

$= 3 \times 4 = 12$

Both the products are not equal, so these fractions are not equivalent.

Or $\frac{2}{3}$ and $\frac{4}{9}$

2×9 and 4×3

18 and 12

Both the products are not equal, so fractions are not equivalent fraction.

Example 2 : Are $\frac{3}{8}$ and $\frac{6}{16}$ equivalent fractions ?

Solution : (Numerator of first fraction) × (Denominator of second fraction)

$= 3 \times 16 = 48$

and

(Denominator of first fraction)×(Numerator of second fraction)

$= 8 \times 6 = 48$

Both the products are equal, so fractions are equivalent fractions.

Exercise-4.3

1. Check the following fractions are equivalent or not :

(a) $\frac{3}{7}$ and $\frac{6}{14}$ (b) $\frac{11}{14}$ and $\frac{77}{98}$ (c) $\frac{6}{9}$ and $\frac{24}{36}$

(d) $\frac{5}{8}$ and $\frac{10}{24}$ (e) $\frac{7}{12}$ and $\frac{14}{21}$ (f) $\frac{8}{9}$ and $\frac{40}{54}$

4.4 Lowest form of Fractions :

If the common factor of numerator and denominator is 1 then the fraction is in the lowest form. So, numerator and denominator of a fraction is divided by their HCF to convert into the simplest form. Let us consider the following example.

Example 1 : Check the fraction $\frac{21}{24}$ is in the lowest form. If not, then write its lowest form.

Solution : To check that $\frac{21}{24}$ is in the lowest form, first we find HCF of 21 and 24.

So, HCF of 21 and 24 = 3

So the fraction is not in the lowest form because HCF of numerator and denominator is not 1.

To convert it into the lowest form, divide numerator 21 and denominator 24 by 3.

$$\frac{21 \div 3}{24 \div 3} = \frac{7}{8}$$

So lowest form of $\frac{21}{24}$ is $\frac{7}{8}$.

Example 2 : Check $\frac{15}{17}$ is in the lowest form or not. If not, then write its lowest form.

Solution : First find HCF of 15 and 17.

and HCF of 15 and 17 = 1

So, $\frac{15}{17}$ is already in its lowest form.

Note : When we convert a fraction into its lowest form, then given fraction is equivalent fraction of lowest form.

As in Example 1 : $\frac{21}{24}$ is equivalent fraction of $\frac{7}{8}$.

Exercise-4.4

1. Check whether the following fractions are in its lowest form or not :

(a) $\frac{12}{14}$ (b) $\frac{21}{35}$ (c) $\frac{13}{17}$ (d) $\frac{25}{50}$ (e) $\frac{14}{21}$

(f) $\frac{8}{13}$ (g) $\frac{7}{15}$ (h) $\frac{14}{27}$ (i) $\frac{25}{35}$ (j) $\frac{18}{23}$

2. Write the lowest form of following fractions.

(a) $\frac{4}{8}$ (b) $\frac{12}{18}$ (c) $\frac{15}{20}$ (d) $\frac{35}{45}$ (e) $\frac{24}{36}$

(f) $\frac{8}{12}$ (g) $\frac{18}{21}$ (h) $\frac{25}{45}$ (i) $\frac{6}{12}$ (j) $\frac{9}{27}$

4.5 Like and Unlike fractions :

The fractions having same denominators are called like fractions and the fractions having different denominator are called unlike fractions. For example

In fractions $\frac{3}{8}, \frac{7}{8}, \frac{4}{8}, \frac{5}{8}$ and $\frac{2}{8}$, denominator is 8, so these are like fractions.

In fractions $\frac{3}{5}, \frac{7}{9}, \frac{4}{7}, \frac{5}{12}$ and $\frac{2}{17}$, denominators are different, so these are unlike fractions.

Example 1 : Write the like fractions of the following :

$$\frac{3}{6}, \frac{7}{8}, \frac{5}{6}, \frac{1}{6}, \frac{3}{4}$$

Solution : Like fractions are $\frac{3}{6}, \frac{5}{6}$ and $\frac{1}{6}$

4.6 Unit Fractions :

The fractions having 1 as numerator are called unit fraction.

Examples : $\frac{1}{5}, \frac{1}{9}, \frac{1}{7}, \frac{1}{12}$

Example 1 : Make a unit fraction whose denominator is 6.

Solution : Unit fraction with denominator 6 = $\frac{1}{6}$

4.7 Proper and Improper Fractions :

Fractions having numerator less than that denominator are called proper fraction.

For examples : $\frac{3}{5}, \frac{7}{9}, \frac{14}{17}$ have numerator less than that of denominator.

Fraction having numerator greater than that of denominator are called improper fraction.

For example : $\frac{8}{5}, \frac{13}{8}, \frac{24}{13}$ have numerator more than that of denominator.

Example 2 : Write the proper and improper fractions in the following :

$\frac{7}{12}, \frac{9}{4}$.

Solution : Proper fraction = $\frac{7}{12}$

[Because numerator is less than the denominator]

Improper fraction = $\frac{9}{4}$

[Because numerator is more than the denominator]

Exercise-4.5

1. Write the like and unlike fractions for the following groups :

(a) $\frac{3}{7}, \frac{5}{7}, \frac{1}{7}$ ☐

(b) $\frac{6}{9}, \frac{4}{9}, \frac{1}{9}$ ☐

(c) $\frac{9}{12}, \frac{7}{11}, \frac{7}{10}$ ☐

(d) $\frac{7}{10}, \frac{6}{10}, \frac{8}{10}$ ☐

(e) $\frac{5}{3}, \frac{5}{7}, \frac{5}{9}$ ☐

2. Write two like fractions for the following :

(a) $\frac{1}{5}, \frac{4}{5}, \frac{3}{5}, -, -$ (b) $\frac{3}{9}, \frac{4}{9}, \frac{7}{9}, -, -$ (c) $\frac{2}{7}, \frac{3}{7}, \frac{9}{7}, -, -$

3. **Write the unit fraction, whose denominator is as follows :**

(a) 7 (b) 5 (c) 8 (d) 3 (e) 15

4. **Which of the following fractions are proper and improper fractions :**

(a) $\frac{7}{12}$ (b) $\frac{8}{3}$ (c) $\frac{12}{18}$ (d) $\frac{3}{5}$ (e) $\frac{7}{9}$

4.8 Comparing and Ordering Fractions :

Activity

Teacher will have discussion with students about a party.

Karan and his friends are fond of cake. They brought four cakes and went to a park for party. Karan's friends sat in different groups as in following diagram. There is same cake with every group. Karan can sit in any group then the cake will be distributed between the children in the groups.

Scene of Party :

Karan

Group 1

Group 2

Group 3

Group 4

Teacher will ask from students that in which group Karan will sit ? Students will tell according to convenience.

Now teacher will ask the distribution of cake from the groups.

If Karan sits in 1 group then in that group, there were already 7 students. Now there will be

8 students in the group so cake will be divided in 8 equal parts. Karan will get $\frac{1}{8}$th part.

If Karan sits in group 2 then there will be 2 children in the group. Cake will be divided into two equal parts and Karan will get $\frac{1}{2}$ of cake.

If Karan sits in group 3 then there will be 4 children in the group and cake will be divided in 4 equal parts. Karan will get $\frac{1}{4}$th part of the cake.

If Karan sits in group 4 then there will be 3 students in that group. Cake will be divided into 3 parts and Karan will get $\frac{1}{3}$rd part of cake.

Now we can observe that out of $\frac{1}{8}, \frac{1}{2}, \frac{1}{4}$ and $\frac{1}{3}$ parts of cake, $\frac{1}{2}$ is the largest.

So, we conclude that when numerators of fractions are equal then fraction with smallest denominator will be largest. Similarly, in fractions of equal numerator, fraction with largest denominator will be smallest.

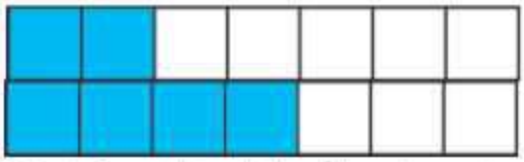
Example 1 : Which fraction is larger $\frac{2}{3}$ or $\frac{2}{7}$?

Solution : In given fractions, numerators are same. So, the fraction having smaller denominator will have larger value. So, the fraction $\frac{2}{3}$ is larger.

Teacher will announce in the class that I have some different chocolates in which some parts has nuts and some parts are without nuts. These chocolates looks like as follows : (Teacher will draw figure on Blackboard on.)

Chocolate-A

Chocolate-B



Teacher will tell that chocolate A has 7 parts, out of which 2 having nuts. So, we can say that part with nuts is $\frac{2}{7}$. Chocolate B has 4 parts out of 7 with nuts. So, the chocolate has $\frac{4}{7}$ part with nuts.

It is clear from above diagram that chocolate B has more nuts than chocolate A.

Fraction of chocolate A with nuts $= \frac{2}{7}$

Fraction of chocolate B with nuts $= \frac{4}{7}$

It concludes from diagram that fraction $\frac{4}{7}$ is greater than that of fraction $\frac{2}{7}$.

If two fractions has same denominator then fraction with larger numerator is greater and fraction with small numerator is smaller.

Example 2 : Which fraction is larger $\frac{3}{5}$ or $\frac{1}{5}$?

Solution : In given fractions, denominator is same. So, fraction with larger numerator is greater. So, $\frac{3}{5}$ is greater than $\frac{1}{5}$.

Example 3 : Write the fractions in ascending order : $\frac{4}{12}, \frac{4}{9}, \frac{4}{7}$ and $\frac{4}{15}$.

Solution : In given fractions, all fractions has same numerator. So the fraction with largest denominator is smallest means in above fraction $\frac{4}{15}$ is the smallest fraction.

So, ascending order is $\frac{4}{15}, \frac{4}{12}, \frac{4}{9}$ and $\frac{4}{7}$.

Example 4 : Write the fractions $\frac{7}{9}, \frac{8}{9}, \frac{3}{9}$ and $\frac{5}{9}$ in ascending order.

Solution : In above fraction, all fractions have same denominator. So the fraction with smaller numerator is smallest means $\frac{3}{9}$ is the smallest fraction.

So, ascending order is $\frac{3}{9}, \frac{5}{9}, \frac{7}{9}$ and $\frac{8}{9}$.

Exercise-4.6

1. Find the greater fraction for each part of the following :

(a) $\frac{2}{5}, \frac{2}{3}$ (b) $\frac{7}{9}, \frac{7}{12}$ (c) $\frac{1}{8}, \frac{1}{4}$ (d) $\frac{4}{6}, \frac{4}{8}$ (e) $\frac{3}{7}, \frac{3}{11}$

(f) $\frac{7}{9}, \frac{4}{9}$ (g) $\frac{3}{4}, \frac{1}{4}$ (h) $\frac{5}{8}, \frac{7}{8}$

2. Find the smaller fraction for each part of the following :

(a) $\frac{3}{5}, \frac{3}{4}$ (b) $\frac{5}{8}, \frac{5}{12}$ (c) $\frac{7}{9}, \frac{4}{9}$ (d) $\frac{3}{6}, \frac{3}{8}$ (e) $\frac{5}{7}, \frac{5}{11}$

(f) $\frac{8}{12}, \frac{5}{12}$ (g) $\frac{9}{4}, \frac{7}{4}$ (h) $\frac{9}{8}, \frac{7}{8}$

3. Write the following in increasing (ascending) order.

(a) $\frac{7}{12}, \frac{4}{12}, \frac{1}{12}, \frac{5}{12}$ (b) $\frac{5}{12}, \frac{5}{9}, \frac{5}{7}, \frac{5}{6}$ (c) $\frac{6}{11}, \frac{4}{11}, \frac{9}{11}, \frac{3}{11}$

(d) $\frac{7}{8}, \frac{7}{12}, \frac{7}{4}, \frac{7}{2}$ (e) $\frac{12}{15}, \frac{12}{13}, \frac{12}{17}, \frac{12}{10}$

Activity

Let us Play :

Cut 4 circles of cardboard of same size. Cut four of them into equal parts according to the following diagrams :

After this teacher can discuss more activities with students according to convenient environment.

4.9 Convert the fraction into Decimals :

As we know the table of place value system which is as follow :

Lakhs		Thousands		Units		
Ten lakh	Lakh	Ten thou-sand	thousand	Hun-dreds	Tens	Ones
10,00,000	1,00,000	10,000	1000	100	10	1

We have studied the units from moving right to left as 1 to lakh. Now we will extend these units starting from ones (left side) to right side.

Hundreds	Tens	Units	Tenth	Hundredth	Thousandth
100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Teacher will tell to the students that $\frac{1}{10}$ (one-tenth) means that one part out of ten equal parts. We write this as 0.1 in decimal form and read as zero decimal one.

Similarly, decimals of different fractions are as follows :

(a) $\frac{3}{10} = 0.3$ (zero decimal three) (b) $\frac{5}{10} = 0.5$ (zero decimal five)

Any fraction having denominator 10, 100, 1000 etc. can be written in decimal from.

$\frac{1}{100}$ (one-hundredth) will be written 0.01 and read as zero decimal zero one.

Similarly $\frac{1}{1000}$ (one thousandth) will be written as 0.001 and read as zero decimal zero zero one.

Similarly some fractions are as follows :

(a) $\frac{4}{100} = 0.04$ (zero decimal zero four)

(b) $\frac{9}{1000} = 0.009$ (zero decimal zero zero nine)

(c) $\frac{35}{10} = 3.5$ (three decimal five)

4.9.1 Fractions not having denominator 10, 100, 1000 :

If any fraction not having denominators 10,100, 1000 etc. then we convert the denominators in 10, 100 and 1000 etc.

For example : In $\frac{1}{2}$ denominator is 2. To convert its denominator into 10, we have to multiply it by 5. If we multiply denominator by 5 then we've to multiply its numerator also by 5 so that fraction must have same value

$\frac{1\times5}{2\times5} = \frac{5}{10} = 0.5$ (Zero decimal five)

Example 1 : Convert $\frac{5}{4}$ into decimal.

Solution : First convert denominator 4 into 100 (because 10 is not multiple of 4).

So $\frac{5\times25}{4\times25} = \frac{125}{100} = 1.25$

While converting the fraction into decimals, after converting denominator in to 10, 100 or 1000 etc. put the decimal from right side leaving as many digits as there are zeros in the denominator.

For example : To convert $\frac{21}{10}$ into decimal. Write 21 and there is one zero in denominator. So, we put decimal from right side leaving one digit in numerator. So decimal formation of $\frac{21}{10}$ is 2.1.

If in numerator, number of digits are less than the number of zeros in denominator then we put zeros to left side of the numerator.

For example : To convert $\frac{48}{1000}$ into decimal. Write 48, now there are 3 zeros in denominator but in numerator we have only two digits. So we put two zeros on left side of digit 4 and we shall get 0048. Now we put decimal after leaving 3 digits from right side.

So, decimal formation of $\frac{48}{1000}$ is 0.048.

4.10 Convert Decimals into Fraction :

As we can convert every fraction into a decimal, similarly we can convert decimal into fractions. So in decimal formation, we shall write 10, 100, 1000 etc. in denominator according to decimal point.

$0.5 = \frac{5}{10}$

$0.02 = \frac{2}{100}$

Let us consider some examples.

Remember

It there is 1 digit after the decimal then denominator is 10.

If there are 2 digits, then denominator is 100.

If there are 3 digits then denominator is 1000.

Example 1 : Write 1.5 in fraction.

Solution : In given decimal, there is 1 digit after decimal point so in denominator, there shall be 10 and from numerator decimal point shall be removed. So, we have $1.5 = \frac{15}{10}$

In this example $\frac{15}{10}$ is not in lowest form. So to convert in lowest form, divide numerator and denominator by 5, as HCF of 10 and 15 is 5.

$$\frac{15 \div 5}{10 \div 5} = \frac{3}{2}$$

So $\frac{3}{2}$ is fraction of 1.5 .

Example 2 : Represent 3.25 in fractional form.

Solution : $3.25 = \frac{325}{100}$

HCF of 325 and 100 = 25

So $\frac{325 \div 25}{100 \div 25} = \frac{13}{4}$

$\frac{13}{4}$ is fractional form of 3.25

Exercise-4.7

1. Convert the following fractions into decimals :

(a) $\frac{9}{10}$ (b) $\frac{35}{100}$ (c) $\frac{31}{1000}$ (d) $\frac{117}{100}$ (e) $\frac{37}{10}$

2. Represent the following fractions into decimals :

(a) $\frac{3}{5}$ (b) $\frac{15}{20}$ (c) $\frac{4}{25}$ (d) $\frac{5}{4}$ (e) $\frac{7}{40}$

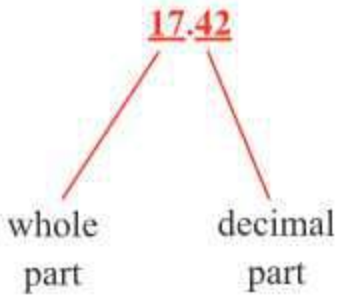
3. Represent the following decimals into fraction :

(a) 1.3 (b) 1.75 (c) 4.5 (d) 0.35 (e) 0.8

(f) 3.84 (g) 8.345 (h) 0.024 (i) 3.001 (j) 0.98

4.10.1 Like and Unlike Decimals :

We know decimal fractions has two parts : One part is whole number and other part is decimal.



- Decimals with same number of decimal places are called **like decimals.** For examples 3.48 and 5.65.
- Decimals having different number of decimal places are called **unlike decimals.** For examples : 3.4 and 5.65.
- We can convert the unlike decimals into like decimals. We may add as many zeros to the right of the last digit after the decimal point

as needed. It does not change the value of the decimal number. For example, 3.4 is same as 3.40. Now this is equivalent to another number 5.65.

Example 1 : Change the following decimals into like decimals :
7.3, 42.506, 0.4, 0.72, 418.33

Solution : In the given decimals, maximum number of decimal digits is 3.

So, we write all decimals in this way that they have 3 decimal digits.

$7.3 = 7.300,\ 0.4 = 0.400,\ 418.33 = 418.330,\ 42.506 = 42.506,\ 0.72 = 0.720$

4.11 Addition and Subtraction of Decimals :

Addition and Subtraction of decimals is same as addition and subtraction of simple numerals. To add/subtract the decimals, we follow the steps given below :

Convert the unlike decimals into like decimals.

Write the addends one below the other so that the decimal points of all addends are one below the other.

Add / subtract as you do while working with whole numbers.

Example 2 : Add 3.5, 4.2 and 6.1.

Solution :

$$\begin{array}{r} 3.5 \\ 4.2 \\ +\ 6.1 \\ \hline 13.8 \\ \hline \end{array}$$

Example 3 : Add 5.22, 7.6 and 8.105

Solution :

$$\begin{array}{rcr} 5.22 & \longrightarrow & 5.220 \\ 7.6 & \longrightarrow & 7.600 \\ +\ 8.105 & \longrightarrow & +\ 8.105 \\ \hline & & 20.925 \\ \hline \end{array}$$

Example 4 : Subtract 3.25 from 6.48

Solution :

$$\begin{array}{r} 6.48 \\ -\ 3.25 \\ \hline 3.23 \end{array}$$

Example 5 : Subtract 2.124 from 4.3.

Solution :

$$4.3 \longrightarrow 4.300$$

$$\begin{array}{rr} 2.124 & \longrightarrow \quad -\ 2.124 \\ & \hline & 2.176 \end{array}$$

Exercise-4.8

1. Add the following decimal numbers :

(a) 2.4, 5.3 and 4.1 (b) 6.25, 5.65 and 3.01

(c) 4.32, 2.320 and 7.038 (d) 8.4, 7.03 and 2.432

(e) 12, 13.8 and 8.120

2. Find the difference of the following decimals/numbers :

(a) 8.82,7.31 (b) 6.9, 3.43

(c) 25.750, 15.375 (d) 45, 13.220

(e) 13.752, 9.27

4.12 Multiplication of decimals :

Multiplication and Division of decimals is same as of simple numerals. We follow the steps given below :

Step 1. Multiply the numbers as whole numbers ignoring the decimal point.

Step 2. Count the number of decimal places in the multiplicand multiplier and add the number of places.

Step 3. Put the decimal point in the product from the right, after as many digits as the total number of decimal places.

Step 4. If number of digits in the product is less than the number of decimal places. Then put decimal by writing 0 on left side of the product.

Example 1 : Find the product of the following :

(a) 3.24×4

Solution :

$$\begin{array}{r} 324 \\ \times\ 4 \\ \hline 1296 \\ \hline \end{array}$$

In this, we'have 3.24 as decimal number with two decimal digits. Put decimal after leaving two digits from right in the product 1296. So required answer is 12.96.

(b) 4.12×8

$$\begin{array}{r} 412 \\ \times\ 8 \\ \hline 3296 \\ \hline \end{array}$$

In 4.12, there are two decimals digits so put decimal after leaving two digits from right in the product 3296. So the product is 32.96

Example 2 : (a) 4.08×15

Solution :

$$\begin{array}{r} 408 \\ \times\ 15 \\ \hline 2040 \\ 4080 \\ \hline 6120 \\ \hline \end{array}$$

$4.08 \times 15 = 61.20$

(b) 6.13×1.4

$$\begin{array}{r} 613 \\ \times\ 14 \\ \hline 2452 \\ 6130 \\ \hline 8582 \\ \hline \end{array}$$

$6.13 \times 1.4 = 8.582$

4.13 Division of Decimals :

Division of Decimal number by a natural number or decimal number is same as simple division.

Example 1 : Divide 4.48 by 4.

Solution :

$$\begin{array}{r} 4\overline{)4.48}\,(\,1.12 \\ -4 \\ \hline 04 \\ -4 \\ \hline 08 \\ -8 \\ \hline 0 \\ \hline \end{array}$$

Example 2 : Divide 7.32 by 6.

Solution :

$$\begin{array}{r} 6\overline{)7.32}\,(\,1.22 \\ -6 \\ \hline 13 \\ -12 \\ \hline 12 \\ -12 \\ \hline 0 \\ \hline \end{array}$$

Example 5 : Divide 3.48 by 4

Solution :

$$
\begin{array}{r}
4\overline{)3.48}\,(\,0.87 \\
-0\downarrow \\
\hline
34 \\
-32\downarrow \\
\hline
28 \\
-28 \\
\hline
\times
\end{array}
$$

Exercise-4.9

1. Find the product of the following decimal numbers :

(a) 5.15×6 (b) 52.4×2 (c) 0.31×5

(d) 9.05×0.2 (e) 7.24×2.3

2. Find the division of the following decimal numbers :

(a) $18.24 \div 3$ (b) $8.64 \div 4$ (c) $2.48 \div 8$

(d) $16.5 \div 15$ (e) $34.3 \div 7$

Learning Outcomes

- Able to know about fractional part of a group.
- to compare the fractions
- Able to convert fraction into decimal & decimal into fraction.
- Able to understand the importance of a fractions in real life.

Answers

Exercise 4.1

1. (a) $\frac{4}{9}$ (b) $\frac{5}{9}$ **2.** (a) $\frac{2}{5}$ (b) $\frac{3}{5}$

3. (a) $\frac{6}{11}$ (b) $\frac{5}{11}$ **4.** (a) 6 (b) 3 (c) 2

Exercise 4.2

3. (a) 3 guavas (b) 2 toffees (c) 3 ice-creams (d) 4 pencils
(e) 2 Rupees (f) 10 pencils (g) 10 centimeter (h) 4 laddoos

4. (a) 8 (b) 2 (c) 4 (d) 2

5. (a) 6 hours (b) 8 hours (c) 2 hours (d) 2 hours
(e) 3 hours (f) 3 hours

Exercise 4.3

1. (a) Yes (b) Yes (c) Yes (d) No
(e) No (f) No

Exercise 4.4

1. (a) No (b) No (c) Yes (d) No
(e) No (f) Yes (g) Yes (h) Yes
(i) No (j) Yes

2. (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) $\frac{7}{9}$
(e) $\frac{2}{3}$ (f) $\frac{2}{3}$ (g) $\frac{6}{7}$ (h) $\frac{5}{9}$
(i) $\frac{1}{2}$ (k) $\frac{1}{3}$

Exercise 4.5

1. (a) Like (b) Like (c) Unlike (d) Like
(e) Unlike

4. (a) Proper (b) Improper (c) Proper
(d) Proper (e) Proper

Exercise 4.6

1. (a) $\frac{2}{3}$ (b) $\frac{7}{9}$ (c) $\frac{1}{4}$ (d) $\frac{4}{6}$
(e) $\frac{3}{7}$ (f) $\frac{7}{9}$ (g) $\frac{3}{4}$ (h) $\frac{7}{8}$

2. (a) $\frac{3}{5}$ (b) $\frac{5}{12}$ (c) $\frac{4}{9}$ (d) $\frac{3}{8}$

(e) $\frac{5}{11}$ (f) $\frac{5}{12}$ (g) $\frac{7}{4}$ (h) $\frac{7}{8}$

3. (a) $\frac{1}{12}, \frac{4}{12}, \frac{5}{12}, \frac{7}{12}$ (b) $\frac{5}{12}, \frac{5}{9}, \frac{5}{7}, \frac{5}{4}$ (c) $\frac{3}{11}, \frac{4}{11}, \frac{6}{11}, \frac{9}{11}$

(d) $\frac{7}{12}, \frac{7}{8}, \frac{7}{4}, \frac{7}{2}$ (e) $\frac{12}{17}, \frac{12}{15}, \frac{12}{13}, \frac{12}{10}$

Exercise 4.7

1. (a) 0.9 (b) 0.35 (c) 0.031 (d) 1.17

(e) 3.7

2. (a) 0.6 (b) .75 (c) .16 (d) 1.25

(e) 0.175

3. (a) $\frac{13}{10}$ (b) $\frac{175}{100}$ (c) $\frac{45}{10}$ (d) $\frac{35}{100}$

(e) $\frac{8}{10}$ (f) $\frac{384}{100}$ (g) $\frac{8345}{1000}$ (h) $\frac{24}{1000}$

(i) $\frac{3001}{1000}$ (j) $\frac{98}{100}$

Exercise 4.8

1. (a) 11.8 (b) 14.91 (c) 13.678 (d) 17.862

(e) 33.92

2. (a) 1.51 (b) 3.47 (c) 10.375 (d) 31.780

(e) 4.482

Exercise 4.9

1. (a) 30.9 (b) 104.8 (c) 1.55 (d) 1.81

(e) 16.652

2. (a) 6.08 (b) 2.16 (c) 0.31 (d) 1.1

(e) 4.9