Lesson- 11

Decimal Fractions

Q5E4L3

You must have noticed how the items in a market are displayed with price label on them. Suppse the price of an item is printed as Rs.30.50. You understand that if you want to buy the thing you have to pay rupees Thirty and fifty paise.

We know that,

100 Paise = 1 rupee

$\therefore$ 1 Paise = $\frac{1}{100}$ rupee

Similarly,

5 Paise = $\frac{5}{100}$ rupee

50 Paise = $\frac{50}{100}$ rupee

As in the case of money we also use fractions on other occasions also as shown below.

$\frac{1}{10}, \frac{6}{10}, \frac{1}{100}, \frac{75}{100}, \frac{1}{1000}, \frac{365}{1000}$ etc.

The denominatars of these fractions are 10, 100 or 1000. These are multiples of 10, that is 1×10, 10×10, 100×10 etc. Fractions with such denominators are called decimal fractions.

Try to recollect

$34697 = (3\times10000) + (4\times1000) + (6\times100) + (9\times10) + (7\times1)$

It is seen that the place value of the number increases 10 times towards left because.

$1\times10 = 10$

$10\times10 = 100$

$100\times10 = 1000$

$1000 \times 10 = 10000$ etc.

Again note that from left to right the place value of the number decreases by 10 times.

Because $100 \div 10 = \frac{100}{10} = 10$ (If 100 items are divided among 10 people equally, each will get 10 items)

Similarly, $\frac{1000}{10} = 100$

$\frac{10000}{10} = 1000$

Let us arrange them as below and note the pattern–

$10000 \div 10 = 1000$

$1000 \div 10 = 100$

$100 \div 10 = 10$

$10 \div 10 = 1$

Now, what is $1 \div 10 = ?$ If 1 object is divided among 10 people equally each part is $\frac{1}{10}$ or one tenth of the object (which is one part of an object divided into ten equal parts). Similarly, if we take one part of an object divided equally to 100 equal parts it is $\frac{1}{100}$ or one hundredth of the object. We can express them in numbers using a point (.) known as decimal point. The point which was used to write 30.50 in the beginning of this lesson is nothing but the decimal point.

Home Assignment

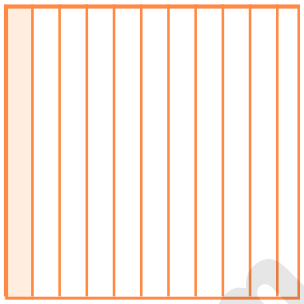
Here the numbers 1to 100 are arranged in columns like first, second.....tenth column with 10 numbers in each column.

If we want to write upto 1000 then we will require 10 number of papers with 100 columns and in each paper there will be 100 columns and in each paper there will be 100 numbers. If you think a little, you will know the number in each of the papers.

1	11								91
2									
3									
4									
5									
6									
7									
8									
9									
10	20	30	40	50	60	70	80	90	100

First column, Second column, Seventh column, Tenth column

Special attention



The number 1 in the previous page has been shown here in a magnified way as a block. If we divide this block into 10 equal parts and take one part of it than it is $\frac{1}{10}$ which is tenth using the decimal point we write it as.1; this is shown as the shaded portion of the block. If we divide this shaded portioin into 10 equal parts and take one part then it is one tenth of 1. You can find 9 equal parts adjacent to the shaded part. Let each part of these be divided into ten equal parts. This means each tenth part is divided into ten equal parts. When the ten tenth parts are divided into 10 'small parts' we will get total 100 'samller parts'. One part of them is shown in the shaded part of the adjoining figure. This small part is one part out of 100 small parts. This is written as $\frac{1}{100}$ and read as ' hundredths' using decimal point $\frac{1}{100}$ is expressed as .01. Note that one part out of tenth part of .1 (this means tenths) is .01 (this means hundredths). The shaded part of figure X and the shaded part of figure Y represent the same area.

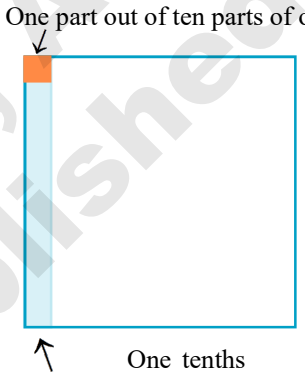


Fig (X)

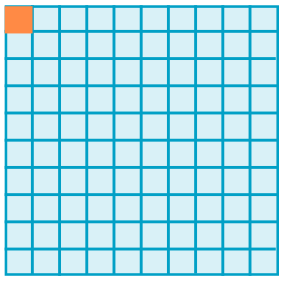


Fig (Y)

In this way when one is divided into ten parts and one part is taken we get one tenth, when one tenth is divided into ten equal parts and one part is taken we get one hundredth part. If we go on then we will get smaller and still smaller parts which are known as thousandths, ten thousandths, hundred thousandths, thousand thousandths etc.

Note the position of the decimal point and value of the decimals from the following table.

Thousands	Hundreds	Ten	Units	position of decimal point	Tenths	Hundredths	Thousandths	Ten Thousandths	Hundred thousandths	Thousand thousandths
1000	100	10	1	.	$\frac{1}{10}=\cdot1$	$\frac{1}{100}=\cdot01$	$\frac{1}{1000}$ $=.001$	$\frac{1}{10000}$ $=.0001$	$\frac{1}{100000}$ $=.00001$	$\frac{1}{1000000}$ $=.000001$

In this table if you go from lefthand side column to right hand side column you have to divide the number by10. For example, $1000 \div 10 = \frac{1000}{10} = 100$.

Again in the table if you move from right hand side to left hand side. (this means from right hand side column to left hand side column) you have to multiply the number by10 for example $10 \times 10 = 100$ (that is why you multiply 10 in the tens column you get 100 in the hundreds column.)

Let us take another example on decimal number

What do we get when we multiply $\frac{1}{100}$ under hundredths column by 10.

$\frac{1}{100} \times 10 = \frac{10}{100}$ Look at the figure-M where out of 100 blocks 10 blocks are shaded

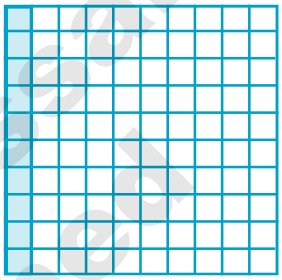


fig (M)

Is it not the same as the shaded portion in figure N? If we place figure M on figure N, then the shaded portions in the two figures will a overlap from figure N it is clear that the shaded portion is 1 part of 10 parts, that is $\frac{1}{10}$

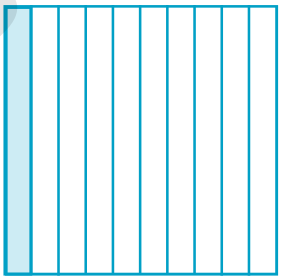


fig (N)

So, $\frac{1}{100} \times 10 = \frac{10}{100} = \frac{1}{10}$

This means when we multiply $\frac{1}{100}$ in the hundredth's column by 10 we get $\frac{1}{10}$ in the tenth's place.

From the table we find that in the decimal system when the place value of numbers decrease by 10 times from the one's place (this means dividing by 10) we get the fraction $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \frac{1}{10000}$ etc.

Rules to read decimal fraction

1. One tenth = $\frac{1}{10} = .1$

   Generaly it is also written as 0.1 and read as Zero point one.

2. If we take 3 parts from10 equal parts it is three tenths and written as $\frac{3}{10}$. It is also written as 0.3 and read as 'Zero point three'

3. One hundredth $= \frac{1}{100} = .01$

It is also written as 0.01and read as 'Zero point Zero one'.

Similarly,

4. $\frac{73}{100} = 0.73$ (Zero point seven three)

5. $\frac{569}{1000} = 0.569$ (Zero point five, six and nine) etc.

Let us write as decimals

(i) 9 tenths $= \frac{9}{10} = 0{\cdot}9$

(ii) Twenty five hundredths $= \frac{25}{100} = 0{\cdot}25$

(iii) Four hundred seventy five thousandth's $= \frac{475}{1000} = 0{\cdot}475$

(iv) Three hundredths $= \frac{3}{100} = 0{\cdot}03$

(v) Eight thousandths $= \frac{8}{1000} = 0{\cdot}008$

Try these

1. Write as decimals

(i) 25 thousandths (ii) 13 ten thousandths (iii) 3059 ten thousandths

2. Express using decimal point.

(i) $\frac{6}{1000}$ (ii) $\frac{25}{1000}$ (iii) $\frac{3}{100}$ (iv) $\frac{105}{10000}$

3. Let us write the following numbers in place value table.

(i) 36.7 (ii) 201.35 (iii) 4631.219

Solution : (i) 36.7

Number	Expanded form		
	Tens	Ones	Tenths ($\frac{1}{10}$)
36.7	3	6	7

(ii) 201.35

Number	Hundreds	Tens	Ones	Tenths ($\frac{1}{10}$)	Hundredths ($\frac{1}{100}$)
201.35	2	0	1	3	5

(iii) 4631.219

Number	Thousands	Hundreds	Tens	Ones	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$
4631.219	4	6	3	1	2	1	9

Decimal fraction and decimal number

We have learnt that $\frac{3}{4}, \frac{27}{125}$ etc are fractions

Similarly, $\frac{6}{10}, \frac{71}{100}$ etc. are also fractions. But in these fractions the decimals is 10 or multiples of 10 (For example 100, 1000 etc) and hence they are called decimal fractions.

We know that, $\frac{6}{10} = 0.6$, $\frac{71}{100} = 0.71$ etc.

Hence, 0.6 , 0.71 are called decimal numbers.

Similarly, 39.4, 601.35, 3.469 etc. are also decimal numbers.

Points to note- Decimal fractions and decimal numbers are same, only the mode of expressing in writing is different. For example, $\frac{61}{100}$ is a decimal fraction and when written as 0.61 it is called a decimal number (this means a number with decimal point).

34.16 is a decimal number. Here 34 is the whole part and .16 is the decimal part.

Types of decimal numbers

(i) **Decimal whole number :** (This is also known as whole number in decimal system)

Example - 9, 37, 149 etc. We can also write as 9.0, 37.0, 149.0. This means there is nothing in the decimal part (Or Zero in the decimal part).

(ii) **Proper decimal fraction :** Example 0.7, 0.19, 0.3015 etc. It has a decimal part but zero in the whole part.

(iii) **Improper decimal fraction :** Let us consider a decimal number 6.17. The exteded form in the table is.

Ones	Tenths	Hundredths
6	1	7

Here it is 6 ones, 1 tenth and 7 hundredths. 6 is the whole number part and the rest after the decimal point is the decimal part.

Note that $6.17 = 6+\frac{17}{100} = 6+\frac{1}{10}+\frac{7}{100}$

Now, $6 + \frac{1}{10}+\frac{7}{100}$

$=6+\frac{1\times10}{10\times10}+\frac{7}{100} = 6+\frac{10}{100}+\frac{7}{100}$

$=6+\frac{10+7}{100}=6+\frac{17}{100}$

Recollect equivalent fractions while doing addition of fractions

Therefore, instead of expressing $6.17 = 6 + \frac{1}{10}+\frac{7}{100}$, we may also write $6.17 = 6 + \frac{17}{100}$.

Here, 6.17 is an improper decimal fraction. Some more examples are : 19.31, 156.3, 1.628 etc.

Let us write in expanded form

Example 1 : 319.47

Hundred	Tens	Ones	Position of decimal point	Tenths	Hundredths
3	1	9	.	4	7

On the basis of the table we can write the place value of the number as follows–

Place value of 3 $=3$ hundreds $= 3 \times 100 = 300$

Place value of 1 $=1$ tens $= 1 \times 10 = 10$

Place value of 9 $=9$ ones $= 9 \times 1 = 9$

Place value of 4 $=4$ tenths $= \frac{4}{10} = 0.4$

Place value of 7 $=7$ hundredths $= \frac{7}{100} = 0{\cdot}07$

Therefore according to place value the expanded from of 319.47

$319.47 = 300+10+9+0.4+0.07$

Example 2 : 39.45

Solution : $39.45 = 3\times 10+9\times 1+4\times\frac{1}{10}+5\times\frac{1}{100}$

$=30+9+\frac{4}{10}+\frac{5}{100}$

$= 30 + 9 + 0.4 + 0.05$

Try these

Find the place value of the following decimal numbers and write in expanded from.

(i) 543.28 (ii) 4275.198

Write the expanded form of the number as decimal number.

$300+60+5+\frac{9}{10}$

Solution : $300+60+5+\frac{9}{10}$

$= 300+60+5+0.9$

$= 365.9$

Write the following number in words as decimal number

Seven hundreds nine tens five ones three tenths eight hundredths.

Solution :

Seven hundreds nine tens five ones three tenths eight hundredths

$= 700+90+5+\frac{3}{10}+\frac{8}{100}$

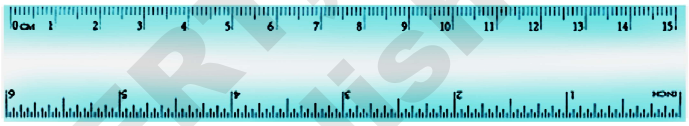
$= 700 +90+5+0.3+0.08$

$= 795.38$

Representing decimals on number line

Let us see how decimals are represented on number line.

If you observe the scale you will find that from the beginning end of the scale (marked 0) to the point where it is marked 1 cm, it is marked with ten small divisions. One small divisions means 1 mm.



So,

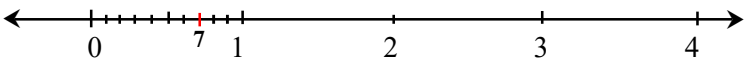
10 mm = 1 cm

This means 1 mm is one tenth of 1 centimetre.

That is, 1 mm= $\frac{1}{10}$ cm = 0.1 cm

Therefore, 5 mm = $\frac{5}{10}$ cm = 0.5 cm (Which is 5 tenths of one centimetre)

Suppose we have to represent 0.7 on the number line. We know $0.7 = \frac{7}{10}$ on 7 tenths.

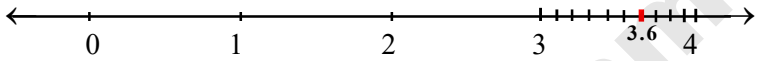


We have learnt that $\frac{7}{10}$ is greater than 0 and less than 1. Therefore, its position is between 0 and 1. The space between 0 and 1 is divided into 10 equal parts and we take 7 parts of them. The number 0.7 is marked on that point on the number line similarly, let us see how we can represent 3.6 on the number line.

We know that $3 \cdot 6 = 3 + \frac{6}{10}$ that is 3 ones and 6 tenths.

Ones	Tenths
3	6

Therefore the number 3.6 will be between 3 and 4. So if we divide the space between 3 and 4 into ten equal parts and take 6 parts of them that point will represent 3.6 on the number line.



Represent the following two points on the number line.

(1) 5.9 (2) 11.4

An easy way to express fractions in decimal numbers.

If the denominator of a fraction is any of 10, 100, 1000 ... etc then put the decimal point before the number of the numerator after counting of the number of zeroes of 1 from right hand side to left hand side of the number. For example,

(1) $\frac{38}{10} = 3.8$ (There is one zero in the denominator. So, in the number, the decimal point is inserted leaving one digit, continug from the right hand side of the numerator).

(2) $\frac{729}{100} = 7.29$ (There are two zeroes in the denominator, so the decimal point is inserted leaving two digits from the right hand side of the numerator).

(3) $\frac{578}{1000} = 0.578$ (Note the position of the decimal point)

(4) $\frac{23}{10000} = 0.0023$ (Try to understand the position of the decimal point)

Note carefully

$\frac{9}{100} = 0.09$ (There is only one digit in the numerator. But the position of the decimal point will be after two digits from the right hand side. So a zero has been placed)

Similarly, $\frac{7}{1000} = 0.007$ (There are three zeroes in the denominator. So there will be three digits aftere the decimal point).

Ordinary fractions as decimal

If the denominator of any fraction can be expressed as 10, 100, 1000 ... etc, then we can use the above method to express the fraction as decimals. Look at the following examples.

$$\frac{5}{2}=\frac{5\times5}{2\times5}$$ (expressed in equivalent fraction)

$$=\frac{25}{10}$$

$$=2.5$$

$$\frac{16}{25}=\frac{16\times4}{25\times4}=\frac{64}{100}=0.64$$

keep in mind
$2\times5=10$
$4\times25=100$
$8\times125=1000$
$16\times625=10000$
These will help you express fractions as decimal

Let us express the following ordinary fractions as decimals

(i) $3\frac{1}{2}$ (ii) $2\frac{3}{8}$ (iii) $11\frac{2}{5}$ (iv) $6\frac{3}{25}$

Solution : (i) $3\frac{1}{2}=\frac{7}{2}=\frac{7\times5}{2\times5}=\frac{35}{10}=3.5$

(ii) $2\frac{3}{8}=\frac{19}{8}=\frac{19\times125}{8\times125}=\frac{2375}{1000}=2.375$

You can also find the solution in the following method

(i) $3\frac{1}{2}=3+\frac{1}{2}=3+\frac{1\times50}{2\times50}=3+\frac{50}{100}=3.5$

(ii) $2\frac{3}{8}=2+\frac{3}{8}=2+\frac{3\times125}{8\times125}=2+\frac{375}{1000}=2.375$

Try to solve (iii) and (iv)

Decimals as ordinary fractions

To express decimals as fractions we first remove the decimal point and write the number as the numerator of the fraction. Next, count the number of digits to the right hand side of the decimal point write the count as number of zeroes to the right hand side of 1 and write it as the denominator of the fractions. Next express the fraction in its lowest form.

Look at the following example -

$0.6 = \frac{6}{10} = \frac{3}{5}$, $4.9 = \frac{49}{10}$

$0.07 = \frac{7}{100}$, $6.35 = \frac{635}{100} = \frac{127}{20}$

$1.319 = \frac{1319}{1000}$

Try the following

1. Express the following decimal numbers as ordinary fractions.
   (a) 4.3 (b) 0.01 (c) 1.1 (d) 60.01 (e) 4.0108

2. Express in decimals
   (a) Nine tenth
   (b) Five tens and seven tenths
   (c) Eight tens, three ones and four tenths
   (d) Five hundredths
   (e) Four thousandths
   (f) Three hundreds five ones and seven hundredths

3. Write in numbers
   (a) zero decimal point one two five
   (b) Five decimal point four
   (c) Seven decimal point zero three
   (d) Twenty three decimal point three five
   (e) Three thousand four hundreds sixty nine decimal point zero eight.

4. Write in words
   (a) 0.2 (b) 1.05 (c) 0.003 (d) 131.25 (e) 2175.439

5. Write the decimal numbers in the place value table
   (a) 0.71 (b) 12.03 (c) 135.049 (d) 0.0101 (e) 4005.1025

6. Write in expanded form
   (a) 0.05 (b) 4.612 (c) 31.79 (d) 144.695 (e) 613.5

7. Express in decimals
   (a) $\frac{3}{10}$ (b) $\frac{3}{100}$ (c) $4+\frac{9}{10}$ (d) $600+50+3+\frac{2}{10}+\frac{3}{100}$

(e) $\frac{89}{10}$ (f) $\frac{614}{100}$ (g) $\frac{15}{1000}$ (h) $60+3+\frac{6}{10}+\frac{5}{100}$

8. Express in decimals

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{3}{50}$ (d) $\frac{7}{40}$

(e) $\frac{1}{8}$ (f) $\frac{1}{5}$ (g) $\frac{3}{20}$

9. Express ordinary fractions in decimals

(a) $6\frac{1}{2}$ (b) $\frac{9}{25}$ (c) $6\frac{31}{125}$ (d) $6\frac{1}{16}$

(e) $25\frac{1}{5}$ (f) $\frac{36}{15}$ (g) $\frac{93}{75}$

10. Express in lowest form

(a) 0.8 (b) 1.5 (c) 31.25 (d) 6.001

(e) 0.625 (f) 101.04 (g) 0.04

11. Fill in the blanks (use decimal point)

(a) 3 mm = ☐ cm (b) 45 mm = ☐ cm

(c) 50 mm = ☐ cm (d) 1 cm = ☐ m

(e) 10 cm = ☐ m (f) 500 cm = ☐ m

12. Between which two whole numbers on the number line do the given numbers lie and which of these whole numbers is nearer the number?

(a) 6.9 (b) 0.7 (c) 31.4 (d) 25.07

13. Show on the number line- (a) 0.6 (b) 5.9 (c) 11.3

Conversion of decimal numbers to similar decimal number

To compare two decimal numbers the decimal part of the two numbers are made similar. The decimal numbers in which the number of digits to the right hand side of the decimal point are equal, those decimal numbers are called similar. For example : 34.05, 612.48, 1.66 are similar.

Let us consider a number 93.8. We can also write this number as 93.80.

Again suppose 6.8 and 49.35 are two other decimal numbers. If we write as 6.80 then 6.80 and 49.35 are similar to each other.

Let us change the following decimal numbers to similar decimal numbers.

(i) 6.7 (ii) 9.05 (iii) 16.630 (iv) 0.31

Solution : Of the above numbers the number at (iii) has digits extended to the largest 3 decimal places (i.e, upto thousandths). So in order to make the decimal numbers similar, we have to extended the numbers to thousandths. We have to do it with zeroes.

Thus, (i) 6.7 = 6.700

(ii) 9.05 = 9.050

(iii) 16.631 = 16.631

(iv) 0.31 = 0.310

Comparing Decimals

Look at the place value table in decimal form.

If we arrange the place values from the larger to the samaller than we will have (only a few place value have been shown) lac > ten thousand > thousand > hundred > tens > ones > tenths > hundredths > thousandths etc.

When we have to compare two numbers, than the larger digit at the larger place values will help to decide which numbers is greater.

Example 1 : Which is greater

(i) 41.73 and 51.69 (ii) 328.41 and 326.37

(iii) 0.692 and 0.652 (iv) 63.45 and 814.87

Solution :

(i) Both the numbers have digits in the ten's place. The digit at the ten's place of one number is 4 and the other is 5. Since 4<5 therefore the later number is greater. This means 51.69 > 41.73

(ii) The digits at the hundreds place and ten's place of both the numbers are same. But the digits 8 at one's place is greater than 6. Therefore the first number is greater, that is 328.41 > 326.37.

(iii) The digits at the tenth's place are same. But in the hundredh's place 9 > 5. Therefore 0.692> 0.652

(iv) The larger number of the first number is at ten's place, the later is at hundred's place. Therefore, 63.45 < 814.87

this means 814.87 > 63.45

Example 2 : Which is greater

(i) 58.9 and 58.93 (ii) 0.74 and 0.742

Solution : (i) Let us write the first numebr as 58.90. Now, we find that the digits in the tens, ones and tenth's place in both the numbers are same. But in the hundredths place 0 is less than 3. Therefore 58.90<58.93.

(ii) 0.74 is written as 0.740. Now, looking at the numbers 0.740 and 0.742 we can say that 0.742 > 0.740.

Example 3 : Arrange the following decimal numbers in descending order.

189.3, 25.63, 198.54, 263.312, 189.32

Solution : The numbers when represented in the place value table are as follows :

Given number	Hundreds	Tens	Ones	Position of decimal point	Tenths	Hundredths	Thousandths
189.3	1	8	9	.	3	-	
25.63		2	5	.	6	3	
198.54	1	9	8	.	5	4	
263.312	2	6	3	.	3	1	2
189.32	1	8	9	.	3	2	

If we compare the digits according to their place value it will be easy to determine the longer or the smaller number, If we arrange them in descending order, we get

263.312 > 198.54 > 189.32 > 189.3> 25.63

Example 4 : Let us arrange the following numbers in asceding order (short method)

641.51, 78.93, 462.54, 643.35, 641.54, 641.62

Solution : Observing the numbers we find,

78.93< 462.54 < 641.51 < 641.54< 641.62< 643.35

Required ascending order 78.93, 462.54, 641.51, 641.54, 641.62, 643.35

Using decimals in daily life

Besides money we use decimal numbers on various occasions in our day to day life. For example

- **Measurements-**

We know 100 cm = 1 meter (meter = m)

= 1 m

Therefore, 1 cm = $\frac{1}{100}$ meter = 0.01 meter

50 cm = $\frac{50}{100}$ meter = 0.50 meter or 0.5 meter

180 cm = 1.80 meter (how?)

Note that 5 cm = 0.05 meter, but 50 cm = 0.5 meter

Again we know that 1000 m = 1 km.

Therefore 1 m = $\frac{1}{1000}$ km = 0.001 km

Similarly, 5 m = $\frac{5}{1000}$ = 0.005 km

50 m = $\frac{50}{1000}$ = 0.05 km

500 m = $\frac{500}{1000}$ = 0.5 km etc.

1125 m = $\frac{1125}{1000}$ = 1.125 km

1750 m = $\frac{1750}{1000}$ = 1.750 km = 1.75 km

- **Weight-**

1000 gram = 1 kilogram

Therefore, 1gram = $\frac{1}{1000}$ kilogram= 0.001 kilogram

Similarly, 25 gram = 0.025 kilogram

375 gram = 0.375 kilogram

5125 gram = 5.125 kilogram etc.

Try these

1. For each pair of numbers which is the larger number

(i) 0.849, 0.819 (ii) 3.614, 3.616 (iii) 120.5, 120.05

(iv) 5010.02, 5010.002 (v) 10001.01, 10010.1 (vi) 156.333, 156.33

2. (✓) the correct answer and (×) the wrong answer

(i) 42.5 = 42.50 (ii) 361.05 < 361.005

(iii) 2.43 < 24.3 (iv) 0.080 > 0.0080 (v) 0.75 < 0.755

3. Arrange in ascending order
   (i) 15.73, 157.3, 1.573, 1573
   (ii) 48.69, 68.69, 48.96, 86.66
   (iii) 1020.01, 1002.01, 1202.10, 10.2001
   (iv) 0.005, 0.05, 0.0005, 0.5
4. Arrange in descending order
   (a) 67.54, 67.45, 76.54, 67.054, 67.55
   (b) 75.7, 75.07, 7.507, 75.007
   (c) 24.38, 28.42, 42.24, 82.42, 48.42
   (d) 143.63, 243.63, 234.36, 134.41, 143.633
5. Using decimal point express
   (a) as rupees (i) 15 paise (ii) 70 paise (iii) 75 paise
   (iv) 675 paise (v) 705 paise (vi) 750 paise
   (b) as meter (i) 35 cm (ii) 90 cm (iii) 270 cm
   (iv) 7 m 70 cm (v) 305 cm
   (c) as kilometer (i) 5 m (ii) 500 m (iii) 50 m
   (iv) 750 m (v) 7050 m (vi) 7005 m
   (d) as kilogram (i) 15 gram (ii) 20 gram (iii) 505 gram
   (iv) 550 gram (v) 5725 gram (vi) 15050 gram
6. Put a tick (✓) in correct answers and (+) in wrong answers. Correct the wrong statements
   (i) 1 mm = 0.1 cm
   (ii) 400 m = 0.04 km
   (iii) 800 m = 0.8 km
   (iv) 1 mm = $\frac{1}{1000}$ m = 0.001 m
   (v) 2785 cm = 27.85 m
   (vi) 7525 g = 7.525 kg
   (vii) 1 miligram = $\frac{1}{1000}$ gram = 0.001 gram
   (viii) 1752 mg = 1.752 gram
   (ix) 1 ml = 0.001 litre
   (x) 3485 mililitre = 3.485 litre

Addition and Subtraction of decimals

While doing addition and subtraction of decimals, the digits of the numbers should be arranged according to place value and in doing so you will find that the decimal points of the numbers falls in order one below the other. The addition and subtraction of the decimal numbers is same as addition and subtraction of whole numbers. In the final answer the decimal point should fall just under the decimal point of the number above it.

Let us add the numbers **531.432, 412.053** and **45.39** Arranging the numbers in the place value table we find-

Given number	Hundreds	Tens	Ones	Position os decimal point	Tenths	Hundredths	Thousandths
531.432	5	3	1	.	4	3	2
412.053	4	1	2	.	0	5	3
45.39		4	5	.	3	9	0
Sum	9	8	8	.	8	7	5

∴ The required sum = 988.875

You can find the sum by adding the numbers in the following way also-

531.432
412.053
45.390 (The zero is placed to express the decimal number similar)
988.875

Let us subtract 76.435 from 38.107

(You can do the subtraction by arranging the numbers in the place value table. You can also perform subtraction in the following shorter way)

76.435
−38.107
38.328

∴ The difference = 38.328

You can compare both the answers

(While doing addition or subtraction of decimal the decimal numbers are to be express as similar)

Let us solve

1. Add 154.7 + 211.54+ 48.72 + 0.893

Solution : First of all, we will express the numbers as similar decimal numbers.

154.7 = 154.700, 211.54= 211.540, 48.72= 48.720, 0.893

154.700
211.540
48.720
+ 0.893
415.853

∴ Required sum = 415.853

2. 23.078 and 71.05 are two decimal numbers. What is the different between them?

Solution : (When it is asked to find the difference between two numbers. it means we have to find the answers when the smaller number is subtracted from the larger number.)

Now, the second number is the larger number than the first number. So we have to subtract the first number from the second number. This means,

$$\begin{array}{r} 71.050 \\ -23.078 \\ \hline 47.972 \end{array}$$

$\therefore$ Required difference = 47.972

3. Ranjan went to the market with his father and bought a book, a geometry box, a pen and a notebook for himself. The price of the book is Rs. 175.50 , geometry box Rs. 65.00, the pen Rs. 22.95 and the note book Rs.15.50.

How much money did his father spend?

Solution :

Price of the book = Rs. 175.50

Price of the geometry box = Rs. 65.00

Price of the pen = Rs. 22.95

Price of the note book = Rs. 15.50

Total money spent = Rs. 278.95

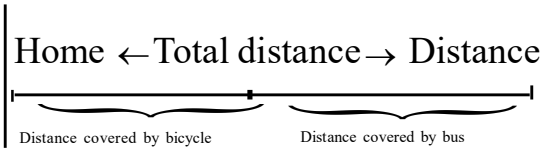
$\therefore$ Required amount spent = Rs. 278.95

4. Barnali's father works in an office in the town. The distance from his home to the office is 22.752km. Her father goes Rs. 3.875 km by bicycle and the remainning distance by bus. How much distance does her father go by bus?

Solution : If we subtract the distance covered by bicycle from the total distance, we can find the distance travelled by bus.

(Look at the figure for proper understanding)

$$\begin{array}{rl} 22.752 & \text{km (Total distance)} \\ -\ 3.875 & \text{km (distance covered)} \\ \hline 18.877 & \text{km} \end{array}$$



$\therefore$ Distance covered by bus = 18.877 km

5. Tarali has a hobby of reading other books than textbooks in her leisure. She dicided to go to the market with her father to buy a few books. She took out Rs.350.75 from her saving box and her mother also gave her Rs. 215.60 from her own savings. With this money Tarali bought two books. Cost of one book was Rs. 225.25 and the other of Rs.175.95. After buying the books how much money remained with Tarali?

Solution : Tarali had Rs. 350.75 and her mother gave Rs.215.60. She spent Rs. 225.25 for one book and Rs.175.95 for the other book.

Therefore, money remained with Tarali

= Rs.350.75 + Rs.215.60 – Rs.225.25 – Rs.175.95

= Rs.566.35 – Rs.401.20

= Rs.165.15

You can also find the solution in the following method.

Tarali has Rs. 350.75 and Rs. 215.60 with her.

$\therefore$ Rs. 350.75

\+ Rs. 215.60

Total = Rs. 566.35

$\therefore$ Total money spent for the two books is Rs.225.25 + Rs.175.95

$\therefore$ Rs. 225.25

\+ Rs. 175.95

Total cost = Rs .401.20

$\therefore$ Money remained with Tarali Rs. 566.35

– Rs. 401.20

Total cost = Rs. 165.15

Exercise

1. Find the sum

   (a) 0.506 + 0.03 + 3.14 + 56.198

   (b) 37.31 + 405.85 + 10.0015 + 9.9

   (c) 635 +42.8 +0.001 + 0.627 + 1.29

   (d) 4.096 +26.3 +543.15 +42.915

2. Arrange the following numbers in ascending order and find the sum

   (i) 94.5, 69.59, 427.001, 3.42, 0.05

   (ii) 146.23, 50.64, 426.53, 6.09, 78.35

3. Subtract

   (i) 89.005 from 370.69 (ii) 0.008 from 6.01

   (iii) 305.62 from 575 (iv) 399.89 from 606.5

4. The three friends Meera, Anima and Rahima checked their weight in a weighing machine. They weighed 36.145kg, 35.916 kg and 38.016 kg respectively. What is their total weight?

5. Pratap bought four books from the book fair. The price of the books were Rs.175.25 and Rs.205.50, Rs. 400 and Rs.213.60 respectively. How much money Pratap spent for the books?

6. Mojammil went on an outing with his parents during his holidays. They went 4.575km by rickshaw, 425.5 km by rail and 25.425 km by bus. What is the total distance they travelled?

7. Romen's father bought 15.500 kg of rice, 2.250 kg of Masur dal, 2.500 kg of potatoes, 1 kg of onion, 3.075 kg of flour from the market. What is the total weight of the things he bought?

8. A milkman had 17 litre 790 mililitre of milk in his milk can. He sold 2.750 litre of milk to one person and 5 litre 375 mililitre milk to another person. How much milk is left in the milk can?

9. David and Nayantara weighed 57.5 kilogram and 49.750 kilogram respectively. Who weighs more and by how much?

10. The difference of two numbers is 213.79. If the larger of the two numbers is 749.53 than what is the smaller number?

11. Suppose distance between two places is 375.250 kilometer. A person travelled first 135.175 kilometer of this distance by bus and another 120.750 kilometer by train. What is the distance remained to reach the place?

12. Simplify

    (a) 93.48 –61.07 + 10899 – 77.5

    (b) 401.55–31.21–47.6–135.73

    (c) 19.6+71.43 +66.76–92.3

    (d) 61.36 +83.04–172.53 + 201.37

******

Answers :

1. (a) 59.874, (b) 453.0615 (c) 679.718 (d) 618.561
2. (i) 427.001, 94.5, 69.59, 3.42, 0.05; Required sum = 594.561

   (ii) 426.53, 146.23, 78.35, 50.35, 7.09; Required sum = 707.84
3. (i) 261.685, (ii) 6.002, (iii) 269.38, (iv) 159.09
4. 110.077
5. Rs. 994.35
6. 455.5 km
7. 23.325 kg
8. 9.665
9. David's weight is more and by 7.750 kg
10. 535.74
11. 119.225 km
12. (a) 63.90 (b) 187.01 (c) 65.46 (d) 173.24

******