Decimals

Chapter 8

8.1 Introduction

Savita and Shama were going to market to buy some stationary items. Savita said, "I have 5 rupees and 75 paise". Shama said, "I have 7 rupees and 50 paise".

They knew how to write rupees and paise using decimals.

So Savita said, I have ₹ 5.75 and Shama said, "I have ₹ 7.50".

Have they written correctly?

We know that the dot represents a decimal point.

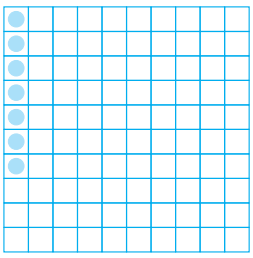
In this chapter, we will learn more about working with decimals.

8.2 Comparing Decimals

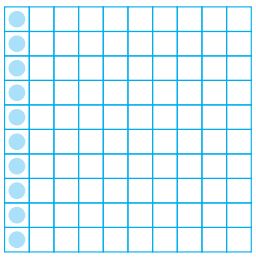
Can you tell which is greater, 0.07 or 0.1?

Take two pieces of square papers of the same size. Divide them into 100 equal parts. For 0.07 we have to shade 7 parts out of 100.

Now, $0.1 = \frac{1}{10} = \frac{10}{100}$, so, for 0.1, shade 10 parts out 100.



$0.07 = \frac{7}{100}$



$0.1 = \frac{1}{10} = \frac{10}{100}$

This means 0.1>0.07

Let us now compare the numbers 32.55 and 32.5. In this case , we first compare the whole part. We see that the whole part for both the nunbers is 32 and, hence, equal.

We, however, know that the two numbers are not equal. So, we now compare the tenth part. We find that for 32.55 and 32.5, the tenth part is also equal, then we compare the hundredth part.

We find,

$32.55 = 32 + \frac{5}{10} + \frac{5}{100}$ and $32.5 = 32 + \frac{5}{10} + \frac{0}{100}$, therefore, 32.55>32.5 as the hundredth part of 32.55 is more.

Example 1 : Which is greater?

(a) 1 or 0.99 (b) 1.09 or 1.093

Solution : (a) $1 = 1 + \frac{0}{10} + \frac{0}{100}$; $0.99 = 0 + \frac{9}{10} + \frac{9}{100}$

The whole part of 1 is greater than that of 0.99.

Therefore, 1 > 0.99

(b) $1.09 = 1 + \frac{0}{10} + \frac{9}{100} + \frac{0}{1000}$; $1.093 = 1 + \frac{0}{10} + \frac{9}{100} + \frac{3}{1000}$

In this case, the two numbers have same parts upto hundredth.

But the thousandths part of 1.093 is greater than that of 1.09.

Therefore, 1.093 > 1.09.

EXERCISE 8.1

1. Which is greater?
   (a) 0.3 or 0.4 (b) 0.07 or 0.02 (c) 3 or 0.8 (d) 0.5 or 0.05
   (e) 1.23 or 1.2 (f) 0.099 or 0.19 (g) 1.5 or 1.50 (h) 1.431 or 1.490
   (i) 3.3 or 3.300 (j) 5.64 or 5.603
2. Make five more examples and find the greater number from them.

Try These

(i) Write 2 rupees 5 paise and 2 rupees 50 paise in decimals.

(ii) Write 20 rupees 7 paise and 21 rupees 75 paise in decimals?

8.3 Using Decimals

8.3.1 Money

We know that 100 paise = ₹ 1

Therefore, 1 paise $= ₹ \frac{1}{100} = ₹ 0.01$

So, 65 paise $= ₹ \frac{65}{100} = ₹ 0.65$

and 5 paise $= ₹ \frac{5}{100} = ₹ 0.05$

What is 105 paise? It is ₹ 1 and 5 paise = ₹ 1.05

8.3.2 Length

Mahesh wanted to measure the length of his table top in metres. He had a 50 cm scale. He found that the length of the table top was 156 cm. What will be its length in metres?

Mahesh knew that

$1 \text{ cm} = \frac{1}{100} \text{ m}$ or 0.01 m

Therefore, $56 \text{ cm} = \frac{56}{100} \text{ m} = 0.56 \text{ m}$

Thus, the length of the table top is

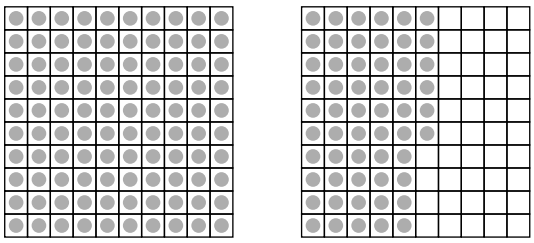
$156 \text{ cm} = 100 \text{ cm} + 56 \text{ cm}$

$= 1 \text{ m} + \frac{56}{100} \text{ m} = 1.56 \text{ m}.$

Try These

1. Can you write 4 mm in 'cm' using decimals?
2. How will you write 7cm 5 mm in 'cm' using decimals?
3. Can you now write 52 m as 'km' using decimals? How will you write 340 m as 'km' using decimals? How will you write 2008 m in 'km'?

Mahesh also wants to represent this length pictorially. He took squared papers of equal size and divided them into 100 equal parts. He considered each small square as one cm.



100 cm 56 cm

8.3.3 Weight

Nandu bought 500g potatoes, 250g capsicum, 700g onions, 500g tomatoes, 100g ginger and 300g radish. What is the total weight of the vegetables in the bag? Let us add the weight of all the vegetables in the bag.

500 g + 250 g + 700 g + 500 g + 100 g + 300 g

= 2350 g

Try These

1. Can you now write 456g as 'kg' using decimals?
2. How will you write 2kg 9g in 'kg' using decimals?

We know that $1000\ g = 1\ kg$

Therefore, $1\ g = \frac{1}{1000}\ kg = 0.001\ kg$

Thus, $2350\ g = 2000\ g + 350\ g$

$= \frac{2000}{1000}\ kg + \frac{350}{1000}\ kg$

$= 2\ kg + 0.350\ kg = 2.350\ kg$

i.e. $2350\ g = 2\ kg\ 350\ g = 2.350\ kg$

Thus, the weight of vegetables in Nandu's bag is 2.350 kg.

EXERCISE 8.2

1. Express as rupees using decimals.
   (a) 5 paise (b) 75 paise (c) 20 paise
   (d) 50 rupees 90 paise (e) 725 paise
2. Express as metres using decimals.
   (a) 15 cm (b) 6 cm (c) 2 m 45 cm
   (d) 9 m 7 cm (e) 419 cm
3. Express as cm using decimals.
   (a) 5 mm (b) 60 mm (c) 164 mm
   (d) 9 cm 8 mm (e) 93 mm
4. Express as km using decimals.
   (a) 8 m (b) 88 m (c) 8888 m
   (d) 70 km 5 m
5. Express as kg using decimals.
   (a) 2 g (b) 100 g (c) 3750 g
   (d) 5 kg 8 g (e) 26 kg 50 g

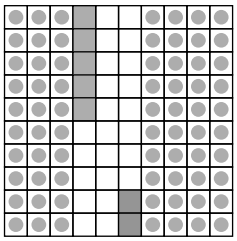
8.4 Addition of Numbers with Decimals

Do This

Add 0.35 and 0.42.

Take a square and divide it into 100 equal parts.

Mark 0.35 in this square by shading
3 tenths and colouring 5 hundredths.
Mark 0.42 in this square by shading
4 tenths and colouring 2 hundredths.



Now count the total number of tenths in the square and the total number of hundredths in the square.

	Ones	Tenths	Hundredths
	0	3	5
+	0	4	2
	0	7	7

Therefore, 0.35 + 0.42 = 0.77

Thus, we can add decimals in the same way as whole numbers.

Can you now add 0.68 and 0.54?

Try These

Find
(i) 0.29 + 0.36 (ii) 0.7 + 0.08
(iii) 1.54 + 1.80 (iv) 2.66 + 1.85

	Ones	Tenths	Hundredths
	0	6	8
+	0	5	4
	1	2	2

Thus, 0.68 + 0.54 = 1.22

Example 2 : Lata spent ₹ 9.50 for buying a pen and ₹ 2.50 for one pencil. How much money did she spend?

Solution : Money spent for pen = ₹ 9.50
Money spent for pencil = ₹ 2.50
Total money spent = ₹ 9.50 + ₹ 2.50
Total money spent = ₹ 12.00

Example 3 : Samson travelled 5 km 52 m by bus, 2 km 265 m by car and the rest 1km 30 m he walked. How much distance did he travel in all?

Solution: Distance travelled by bus = 5 km 52 m = 5.052 km
Distance travelled by car = 2 km 265 m = 2.265 km
Distance travelled on foot = 1 km 30 m = 1.030 km

Therefore, total distance travelled is

$$\begin{array}{r} 5.052 \text{ km} \\ 2.265 \text{ km} \\ + \quad 1.030 \text{ km} \\ \hline 8.347 \text{ km} \end{array}$$

Therefore, total distance travelled = 8.347 km

Example 4 : Rahul bought 4 kg 90 g of apples, 2 kg 60 g of grapes and 5 kg 300 g of mangoes. Find the total weight of all the fruits he bought.

Solution : Weight of apples = 4 kg 90 g = 4.090 kg

Weight of grapes = 2 kg 60 g = 2.060 kg

Weight of mangoes = 5 kg 300 g = 5.300 kg

Therefore, the total weight of the fruits bought is

$$\begin{array}{r} 4.090 \text{ kg} \\ 2.060 \text{ kg} \\ + \quad 5.300 \text{ kg} \\ \hline 11.450 \text{ kg} \end{array}$$

Total weight of the fruits bought = 11.450 kg.

EXERCISE 8.3

1. Find the sum in each of the following :
   (a) 0.007 + 8.5 + 30.08
   (b) 15 + 0.632 + 13.8
   (c) 27.076 + 0.55 + 0.004
   (d) 25.65 + 9.005 + 3.7
   (e) 0.75 + 10.425 + 2
   (f) 280.69 + 25.2 + 38
2. Rashid spent ₹ 35.75 for Maths book and ₹ 32.60 for Science book. Find the total amount spent by Rashid.
3. Radhika's mother gave her ₹ 10.50 and her father gave her ₹ 15.80, find the total amount given to Radhika by the parents.
4. Nasreen bought 3 m 20 cm cloth for her shirt and 2 m 5 cm cloth for her trouser. Find the total length of cloth bought by her.
5. Naresh walked 2 km 35 m in the morning and 1 km 7 m in the evening. How much distance did he walk in all?

6. Sunita travelled 15 km 268 m by bus, 7 km 7 m by car and 500 m on foot in order to reach her school. How far is her school from her residence?
7. Ravi purchased 5 kg 400 g rice, 2 kg 20 g sugar and 10 kg 850g flour. Find the total weight of his purchases.

8.5 Subtraction of Decimals

Do This

Subtract 1.32 from 2.58

This can be shown by the table.

	Ones	Tenths	Hundredths
	2	5	8
–	1	3	2
	1	2	6

Thus, 2.58 – 1.32 = 1.26

Therefore, we can say that, subtraction of decimals can be done by subtracting hundredths from hundredths, tenths from tenths, ones from ones and so on, just as we did in addition.

Sometimes while subtracting decimals, we may need to regroup like we did in addition.

Let us subtract 1.74 from 3.5.

	Ones	Tenths	Hundredths
	3	5	0
–	1	7	4
	1	7	6

Subtract in the hundredth place.

Can't subtract !

so regroup

$$\begin{array}{r} {}^{2}\cancel{3}\ .\ {}^{14}\cancel{5}\ {}^{10}0 \\ -\ 1\ .\ 7\ 4 \\ \hline 1\ .\ 7\ 6 \\ \hline \end{array}$$

Thus, 3.5 – 1.74 = 1.76

Try These

1. Subtract 1.85 from 5.46 ;
2. Subtract 5.25 from 8.28 ;
3. Subtract 0.95 from 2.29 ;
4. Subtract 2.25 from 5.68.

Example 5 : Abhishek had ₹ 7.45. He bought toffees for ₹ 5.30. Find the balance amount left with Abhishek.

Solution : Total amount of money = ₹ 7.45

Amount spent on toffees = ₹ 5.30

Balance amount of money = ₹ 7.45 – ₹ 5.30 = ₹ 2.15

Example 6 : Urmila's school is at a distance of 5 km 350 m from her house. She travels 1 km 70 m on foot and the rest by bus. How much distance does she travel by bus?

Solution : Total distance of school from the house = 5.350 km

Distance travelled on foot = 1.070 km

Therefore, distance travelled by bus = 5.350 km – 1.070 km

= 4.280 km

Thus, distance travelled by bus = 4.280 km or 4 km 280 m

Example 7 : Kanchan bought a watermelon weighing 5 kg 200 g. Out of this she gave 2 kg 750 g to her neighbour. What is the weight of the watermelon left with Kanchan?

Solution : Total weight of the watermelon = 5.200 kg

Watermelon given to the neighbour = 2.750 kg

Therefore, weight of the remaining watermelon

= 5.200 kg – 2.750 kg = 2.450 kg

EXERCISE 8.4

1. Subtract :
   (a) ₹ 18.25 from ₹ 20.75
   (b) 202.54 m from 250 m
   (c) ₹ 5.36 from ₹ 8.40
   (d) 2.051 km from 5.206 km
   (e) 0.314 kg from 2.107 kg
2. Find the value of :
   (a) 9.756 – 6.28
   (b) 21.05 – 15.27
   (c) 18.5 – 6.79
   (d) 11.6 – 9.847

3. Raju bought a book for ₹ 35.65. He gave ₹ 50 to the shopkeeper. How much money did he get back from the shopkeeper?
4. Rani had ₹ 18.50. She bought one ice-cream for ₹ 11.75. How much money does she have now?

5. Tina had 20 m 5 cm long cloth. She cuts 4 m 50 cm length of cloth from this for making a curtain. How much cloth is left with her?

6. Namita travels 20 km 50 m every day. Out of this she travels 10 km 200 m by bus and the rest by auto. How much distance does she travel by auto?
7. Aakash bought vegetables weighing 10 kg. Out of this, 3 kg 500 g is onions, 2 kg 75 g is tomatoes and the rest is potatoes. What is the weight of the potatoes?

What have we discussed?

1. Every decimal can be written as a fraction.
2. Any two decimal numbers can be compared among themselves. The comparison can start with the whole part. If the whole parts are equal then the tenth parts can be compared and so on.
3. Decimals are used in many ways in our lives. For example, in representing units of money, length and weight.