

# CHAPTER 6: DECIMALS AND FRACTIONS

## 6.1 Decimals

### Understanding tenths

Look at the rectangle below.

Let's divide it in 10 equal parts and colour one of them.



We have coloured one part out of 10. That is  $\frac{1}{10}$  or one tenth of the rectangle.

$\frac{1}{10}$  is smaller than 1 whole. You can see that 10 one tenths make 1 whole.

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

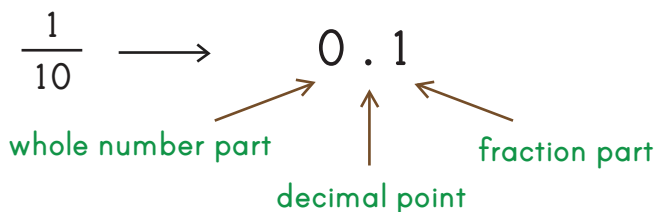
$$10 \times \frac{1}{10} = 1$$

Recall the place value chart.

To show one tenth of a whole, we will add another column of tenths in it.

Since, one tenth is smaller than one, we will add the column on the right side after a decimal point.

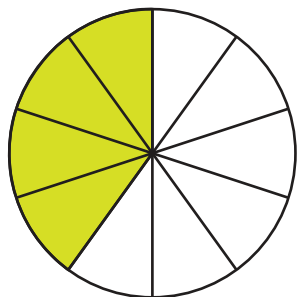
Ones	•	Tenths
0		1



The decimal 0.1 has 0 ones and 1 tenth. We read it as **zero point one**.

A decimal has a whole number part and a fraction part that is separated by a decimal point.

4 out of 10 parts of the circle are coloured.



4 one tenths of the circle are coloured.

$$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{4}{10}$$

$$0.1 + 0.1 + 0.1 + 0.1 = 0.4$$

$\frac{4}{10}$  or 0.4 of the circle is coloured.

Let's make a place value table for decimal 0.4.

Ones	•	Tenths
	•	
0	•	4



In the decimal 0.4,

The digit 0 is in the ones place. It has a value of 0.

The digit 4 is in the tenths place. It has a value of 0.4.

We read it as zero point four.

Identify ones and tenths in the following decimals and complete the place value table.

0.7

0.8

Ones	•	Tenths
	•	
	•	

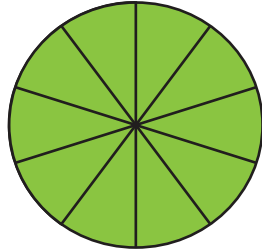
Write the following as decimals.

$$\frac{2}{10} = \boxed{0.2}$$

$$7 \text{ tenths} = \boxed{\phantom{0.}}$$

$$\text{zero point 5} = \boxed{\phantom{0.}}$$

We know that 10 one tenths make a whole.



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

10 tenths = 1 one.

If we have 10 tenths, we can regroup them into 1 ones and 0 tenths.

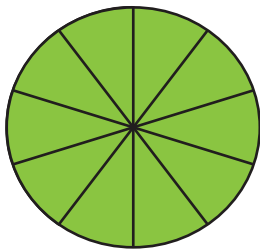
Step 1

Ones	•	Tenths
	•	
0	•	10

Step 2

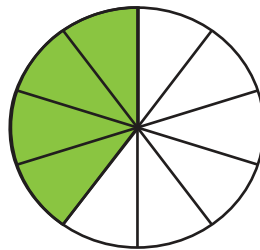
Ones	•	Tenths
1	•	
1	•	0

Look at the parts of circles coloured below.



$$\frac{10}{10}$$

+



$$\frac{4}{10}$$

=

$$\frac{14}{10}$$

=

$$1\frac{4}{10}$$

We can also say that 14 tenths is equal to 1 one and 4 tenths.

Let's write 14 tenths as a decimal.

We will regroup 14 tenths into 1 ones and 4 tenths.

14 tenths = 1 ones and 4 tenths

$$= 1 + 0.4$$

$$= 1.4$$

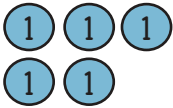

We read it as **one point four**.

$$\text{So, } \frac{14}{10} = 1\frac{4}{10} = 1.4$$

Let's write 53 tenths as a decimal.

We will regroup 53 tenths into 5 ones and 3 tenths.

Look at the place value table.

Ones	•	Tenths
	•	
5	•	3

In the decimal 5.3,

The digit 5 is in the ones place. It has a value of 5.

The digit 3 is in the tenths place. It has a value of 0.3.

$$53 \text{ tenths} = 5 \text{ ones} + 3 \text{ tenths}$$

$$5.3 = 5 + 0.3$$

We read it as **five point three**.

Identify ones and tenths in the following decimals and complete the place value table.

	Ones	•	Tenths
1.8		•	
7.2		•	
9.5		•	

Write each of the following as a decimal.

$49 \text{ tenths} = \square$

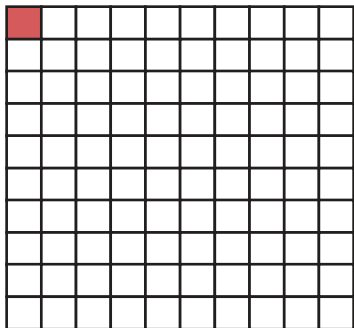
$\frac{17}{10} = \square$

$36 \text{ tenths} = \square$

# Understanding hundredths

Look at the square.

It is divided into 100 equal parts.



Each part of the square is one hundredth or  $\frac{1}{100}$  of the whole.

1 tenth = 10 hundredths

$\frac{1}{100}$  can be written as 0.01.

We read it as **zero point zero one**.

Can you write  $\frac{3}{100}$  as a decimal?

$$\frac{3}{100} = 0.03$$

Ones	Tenths	Hundredths
		● ● ●
0	0	3

Hundredths is smaller than tenths, so we will add another column of hundredths on the right side in the place value table.

Write  $\frac{10}{100}$  as a decimal.

Ones	Tenths	Hundredths
		● ● ● ● ● ● ● ●
0	0	10

→

Ones	Tenths	Hundredths
	●	
0	1	0

10 hundredths = 1 tenth

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

Write 13 hundredths as a decimal.

We will regroup 13 hundredths into 1 tenth and 3 hundredths.

$$\begin{aligned} 13 \text{ hundredths} &= 1 \text{ tenth and } 3 \text{ hundredths} \\ &= 0.1 + 0.03 \\ &= 0.13 \end{aligned}$$

Let's now write  $\frac{100}{100}$  as a decimal.

$$\frac{100}{100} = 100 \text{ hundredths} = 1 \text{ one.}$$

10 hundredths = 1 tenth  
100 hundredths = 10 tenths = 1 one

Make a place value table for 2.43.

Ones			Tenths			Hundredths
① ①	•		● ● ● ●			● ● ●
2	•		4			3

In the decimal 2.43,

The digit 2 is in the ones place. It has a value of 2.

The digit 4 is in the tenths place. It has a value of 0.4.

The digit 3 is in the hundredths place. It has a value of 0.03.

$$2.43 = 2 + 0.4 + 0.03$$

We read it as **two point four three**.

Identify tens, ones, tenths and hundredths in the given decimals.

	Tens	Ones			Tenths	Hundredths
14.13			•			
2.35			•			

Write the following as decimals.

51 hundredths =

$\frac{9}{100} =$

$\frac{23}{100} =$

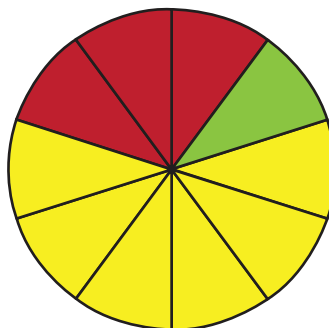
## Exercise 6.1

1. The circle is divided into 10 parts and they are coloured with three colours. Write the fraction and decimal for each colour.

$$\text{Red} = \frac{3}{10} = 0.3$$

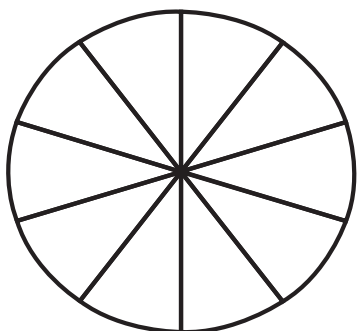
$$\text{Green} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

$$\text{Yellow} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

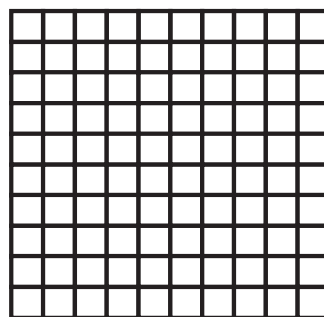


2. Colour

a) 0.4 of the figure.



b) 0.12 of the figure.



3. Write the following fractions as decimals.

$$\text{a) } \frac{7}{10} = \frac{\quad}{\quad}$$

$$\text{b) } \frac{6}{10} = \frac{\quad}{\quad}$$

$$\text{c) } \frac{9}{10} = \frac{\quad}{\quad}$$

$$\text{d) } \frac{71}{100} = \frac{\quad}{\quad}$$

$$\text{e) } \frac{2}{100} = \frac{\quad}{\quad}$$

$$\text{f) } \frac{43}{100} = \frac{\quad}{\quad}$$

$$\text{g) } \frac{31}{100} = \frac{\quad}{\quad}$$

$$\text{h) } \frac{5}{100} = \frac{\quad}{\quad}$$

$$\text{i) } \frac{11}{100} = \frac{\quad}{\quad}$$

4. Write the following as decimals:

- a) Zero point 5 =
- b) Five point three =
- c) Two point four three =
- d) Sixty nine point three nine =
- e) Sixty one point four six =
- f) Two hundred and fifty seven point three one =

5. Write the following decimals in words:

- a) 0.31 zero point three one.
- b) 2.31 \_\_\_\_\_
- c) 4.32 \_\_\_\_\_
- d) 0.9 \_\_\_\_\_
- e) 78.11 \_\_\_\_\_
- f) 19.43 \_\_\_\_\_

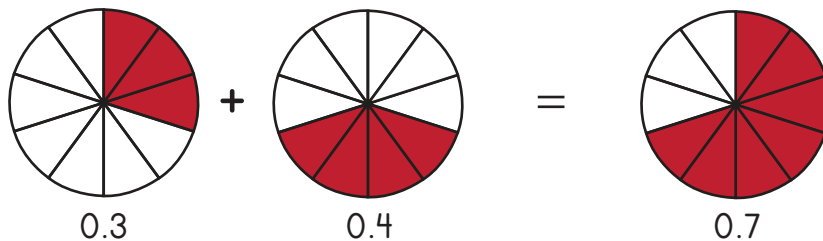
6. Identify place value of the underlined digits.

- a) 1.2
- b) 25.7
- c) 2.62
- d) 41.4
- e) 13.87
- f) 36.81



## 6.2 Adding decimals

Ahmad colours 0.3 of a circle. Sara colours 0.4 of a circle. How much do they colour altogether?



Addition of decimals is similar to addition of whole numbers.

Let's write both decimals according to the place value of their digits and start adding from the right. Remember to put decimal under decimal.

Ones	•	Tenths
0	•	3
+	•	4
	•	7

Step

1 Add the tenths.  $3 + 4 = 7$

Ones	•	Tenths
0	•	3
+	•	4
0	•	7

Step

2 Add the ones.  $0 + 0 = 0$

Can you now add 1.7 and 6.5?

We will follow the same steps.

Ones	•	Tenths
1	•	7
+	•	5
	•	2

Step

1 Add the tenths.  $7 + 5 = 12$   
12 tenths = 2 tenths and 1 one.

Ones	•	Tenths
1	•	7
+	•	5
8	•	2

Step

2 Add the ones. Don't forget to add the carried one.  
 $1 + 6 + 1 = 8$

The answer is 8.2

Add the following decimals:

$$\begin{array}{r} 3 . 4 \\ + 2 . 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 3 . 0 \\ + 8 . 7 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 6 . 8 \\ + 3 . 6 \\ \hline \\ \hline \end{array}$$

Let's add 2.85 and 4.34

We will write both decimals according to the place value of their digits and start adding from the right.

①

	Ones	•	Tenths	Hundredths
	2	•	8	5
+	4	•	3	4
	7	•	1	9



Step 1

Add hundredths.  $5 + 4 = 9$ .

Step 2

Add tenths.  $8 + 3 = 11$ . 11 tenths = 1 tenth and 1 one.

Step 3

Add Ones.  $2 + 4 + 1 = 7$ .

Can you now add 32.55 and 13.51?

We will write both decimal numbers according to the place value of their digits and follow the same steps.

①

	Tens	Ones	•	Tenths	Hundredths
	3	2	•	5	5
+	1	3	•	5	1
	4	6	•	0	6

The answer is 46.06

## Exercise 6.2

1. Add the following decimals:

$$\begin{array}{r} \text{a) } 0.3 \\ + 0.6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 3.4 \\ + 5.3 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 0.34 \\ + 0.53 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 4.52 \\ + 3.24 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 2.71 \\ + 1.35 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 15.35 \\ + 12.60 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 25.09 \\ + 23.93 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 14.39 \\ + 23.78 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 15.37 \\ + 17.32 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 28.56 \\ + 31.23 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 23.54 \\ + 15.38 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 47.56 \\ + 34.23 \\ \hline \\ \hline \end{array}$$

2. Line up the following decimals in vertical columns and find their sum:

a)  $0.1 + 0.5 =$

b)  $1.2 + 1.7 =$

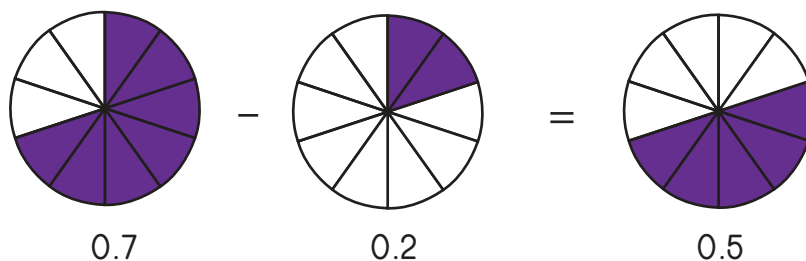
c)  $5.21 + 3.27 =$

d)  $14.11 + 21.34 =$

e)  $21.35 + 37.41 =$

## 6.3 Subtracting decimals

Sara colours 0.7 of a circle. She then erases 0.2 of it. How much circle is left coloured?



Subtraction of decimals is similar to subtraction of whole numbers.

We will write both decimals according to the place value of their digits and start subtracting from the right. **Remember to put decimal under decimal.**

Ones	•	Tenths
0	•	7
-	•	2
0	•	5

Step

**1** Subtract the tenths.  
 $7 - 2 = 5$

Ones	•	Tenths
0	•	7
-	•	2
0	•	5

Step

**2** Subtract the ones.  
 $0 - 0 = 0$

The answer is 0.5

Can you now subtract 11.91 from 56.34?

We will write both decimals according to the place value of their digits and follow the same steps.

Tens	Ones	•	Tenths	Hundredths
5	<del>6</del>	•	13	4
-	1	•	9	1
4	4	•	4	3

The answer is 44.43

## Exercise 6.3

1. Subtract the given decimals.

$$\begin{array}{r} \text{a)} \quad 0.9 \\ - 0.5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{b)} \quad 3.67 \\ - 0.53 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{c)} \quad 4.75 \\ - 2.37 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{d)} \quad 6.78 \\ - 3.45 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{e)} \quad 8.45 \\ - 3.27 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{f)} \quad 9.75 \\ - 6.84 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{g)} \quad 8.73 \\ - 5.96 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{h)} \quad 39.13 \\ - 37.26 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{i)} \quad 50.41 \\ - 15.32 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{j)} \quad 43.78 \\ - 21.54 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{k)} \quad 85.42 \\ - 34.68 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{l)} \quad 57.89 \\ - 29.97 \\ \hline \\ \hline \end{array}$$

2. Line up the decimals according to the place value of their digits and find their difference:

$$\text{a)} \quad 0.7 - 0.3 = \quad \boxed{\phantom{00}}$$

$$\text{b)} \quad 1.5 - 1.2 = \quad \boxed{\phantom{00}}$$

$$\text{c)} \quad 23.5 - 11.1 = \quad \boxed{\phantom{00}}$$

$$\text{d)} \quad 91.7 - 52.3 = \quad \boxed{\phantom{00}}$$

$$\text{e)} \quad 48.31 - 26.21 = \quad \boxed{\phantom{00}}$$