

# CHAPTER 9

## Measurement and the Decimal Point

If the cost of the ball is 3 dollars and 10 cents,  
we write the price **\$3.10**



A decimal point is used to separate the dollars  
and cents, but it is also used to extend the number system.

1 How many 10c coins make \$1?

10c is  $\frac{1}{10}$  of \$1

2 Use a calculator. Press  
What happens?

**3 . 1 0 +**



How many cents is:

3 a  $\frac{2}{10}$  of a dollar?      b  $\frac{5}{10}$  of a dollar?      c  $\frac{8}{10}$  of a dollar?

4 a 30c is  $\frac{\square}{10}$  of a dollar

b 60c is  $\frac{\square}{10}$  of a dollar

**\$1.70**

The first column after the decimal  
point represents tenths.



## More on Decimal Points

- 1 How many 10cm sticks make 1 metre?

10cm is  $\frac{1}{10}$  of a metre

10cm

- 2 How many centimetres is:
- a  $\frac{2}{10}$  of a metre?      b  $\frac{4}{10}$  of a metre?      c  $\frac{6}{10}$  of a metre?
- 3 a 30cm is  $\frac{\square}{10}$  of a metre      b 50cm is  $\frac{\square}{10}$  of a metre

$$1 \text{ metre } 30\text{cm} = 1\frac{3}{10}\text{m} = 1.3\text{m}$$

Using the column after a decimal point instead of writing the fraction tenths is called **decimal fractions**.

Write these measurements as decimal fractions.

- |                     |                      |                     |
|---------------------|----------------------|---------------------|
| 4 2m 40cm           | 5 $3\frac{4}{10}$ m  | 6 6m 30cm           |
| 7 $7\frac{7}{10}$ m | 8 5m 50cm            | 9 $4\frac{6}{10}$ m |
| 10 2m 70cm          | 11 $8\frac{2}{10}$ m | 12 5m 90cm          |

### Challenge

How would you write these measurements as decimal fractions?

3m 25cm, 5m 76cm, 8m 38cm, 10m 5cm, 63cm, 74cm



## The Decimal Point and Capacity

You will need a one-litre container and a 100mL measure.

- 1 How many 100mL measures will fill the litre container?

100mL is  $\frac{1}{10}$  of a litre



- 2 How many mL is:
- a  $\frac{3}{10}$  of a litre?      b  $\frac{6}{10}$  of a litre?      c  $\frac{8}{10}$  of a litre?
- 3 a 500 mL is  $\frac{\square}{10}$  of a litre      b 200 mL is  $\frac{\square}{10}$  of a litre

$$2 \text{ litres } 400\text{mL} = 2 \frac{4}{10} \text{ L} = 2.4\text{L}$$

Write these measures as decimal fractions.

- |                      |                       |                      |
|----------------------|-----------------------|----------------------|
| 4 2L 600mL           | 5 $3 \frac{7}{10}$ L  | 6 5L 400mL           |
| 7 $1 \frac{8}{10}$ L | 8 4L 300mL            | 9 $6 \frac{6}{10}$ L |
| 10 3L 200mL          | 11 $7 \frac{5}{10}$ L | 12 4L 100mL          |

### Challenge

How would you write:

4L 275mL? 2L 325mL? 5L 50mL? 100mL? 350mL?

## The Decimal Point and Weight

You will need a 1kg weight, some 100g weights and some balances.



1 How many 100g weights balance the 1kg weight?

100g is  $\frac{1}{10}$  of a kilogram

2 How many grams is:

a  $\frac{4}{10}$  of a kg?

b  $\frac{8}{10}$  of a kg?

c  $\frac{9}{10}$  of a kg?

3 a 300g is  $\frac{\square}{10}$  of a kg

b 600g is  $\frac{\square}{10}$  of a kg

$$3\text{kg } 500\text{g} = 3\frac{5}{10}\text{kg} = 3.5\text{kg}$$

Write these weights as decimal fractions.

4 2kg 700g

5  $6\frac{7}{10}$  kg

6 3kg 200g

7  $5\frac{3}{10}$  kg

8 4kg 800g

9  $1\frac{6}{10}$  kg

10 7kg 100g

11  $3\frac{4}{10}$  kg

12 2kg 500g

### Challenge

How would you write:



3kg 450g? 6kg 785g? 2kg 75g? 200g? 475g?



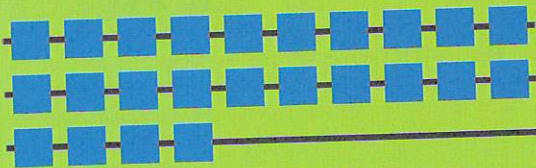
# CHAPTER 10

## Reading and Writing Decimals

### Decimals and Tenths

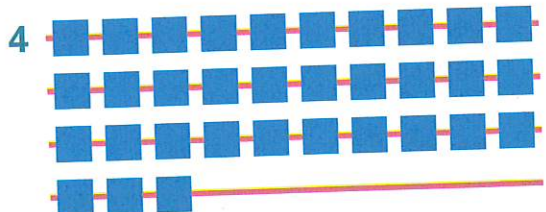
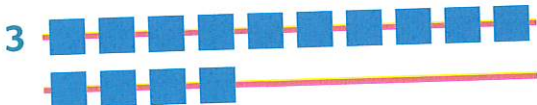
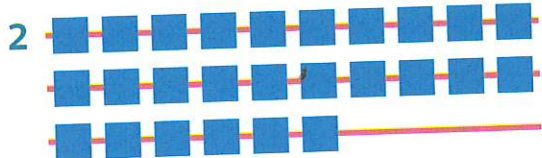
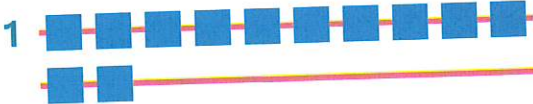
If  represents 1 whole  
 then  represents 1 tenth

One-tenth can be written as  $\frac{1}{10}$  or as a decimal fraction 0.1



is 2.4  
two point four

Write what these diagrams represent.



0.1 is  $\frac{1}{10}$   
zero point one is  
one-tenth

2.1 is  $2\frac{1}{10}$   
two point one is  
two and one-tenth

### Writing decimals and fractions

Write these fractions as a decimal fraction.

1  $3\frac{4}{10}$

2  $7\frac{6}{10}$

3  $4\frac{3}{10}$

4  $6\frac{7}{10}$

5  $\frac{5}{10}$

6  $3\frac{8}{10}$

7  $2\frac{2}{10}$

8  $5\frac{9}{10}$

Write these decimal fractions as fractions.

9 4.2

10 2.4

11 5.1

12 1.5

13 0.8

14 3.3

15 6.7

16 7.6

### Comparing decimals

Use  $>$ ,  $<$  or  $=$  to complete the following questions.

17 2.1 \_\_\_\_\_ 1.2

18 3.6 \_\_\_\_\_ 3.4

19 4.8 \_\_\_\_\_  $4\frac{8}{10}$

20  $3\frac{2}{10}$  \_\_\_\_\_ 2.3

21 7.6 \_\_\_\_\_ 4.7

22 0.8 \_\_\_\_\_ 0.2

23 3.1 \_\_\_\_\_ 8.9

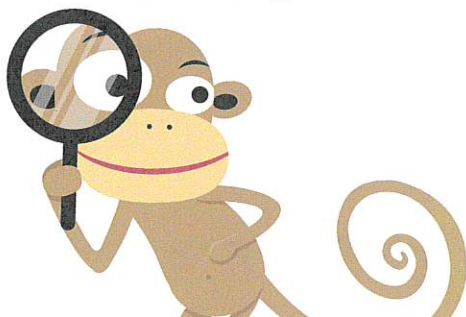
24  $14\frac{3}{10}$  \_\_\_\_\_ 4.4

25 15.9 \_\_\_\_\_  $5\frac{9}{10}$

26 9.8 \_\_\_\_\_ 8.7

27 3.9 \_\_\_\_\_ 9.3

28 13.1 \_\_\_\_\_ 1.3



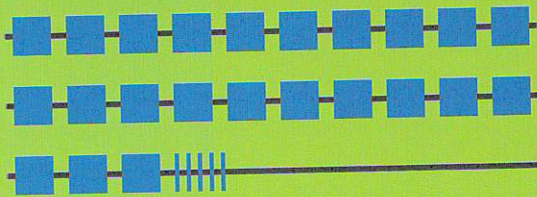




## Decimals and Hundredths

If represents 1 whole  
 then represents 1 tenth  
 then represents 1 hundredth

one-hundredth can be written as  $\frac{1}{100}$  or as a decimal fraction 0.01(zero point zero one)



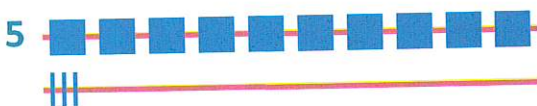
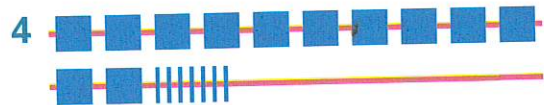
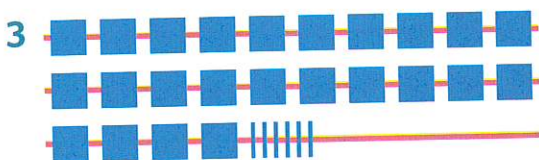
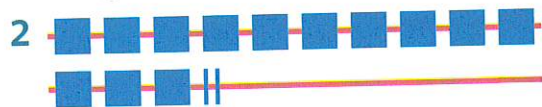
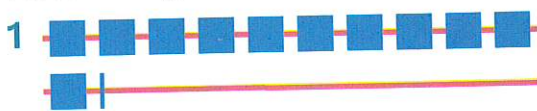
2 whole

3 tenths    5 hundredths

is 2.35

two point three five

Write in figures and words what these diagrams represent.



## More Decimals

hundreds	tens	ones	tenths	hundredths
1	0	0		
	1	0		
		1		
		0	1	
		0	0	1

1 hundred  
 ten  
 one  
 1 tenth  
 1 hundredth

Write these numbers as decimal fractions.

- 1 two point six eight
- 2 fourteen point seven two
- 3 twenty-eight point zero six
- 4 eighty point nine one
- 5 two hundred point five four
- 6 one hundred and two point one six



Use  $>$ ,  $<$  or  $=$  to complete these equations.

- |                            |                             |
|----------------------------|-----------------------------|
| <b>7</b> 5.16 _____ 5.61   | <b>8</b> 17.62 _____ 176.2  |
| <b>9</b> 37.37 _____ 73.73 | <b>10</b> 3.06 _____ 3.6    |
| <b>11</b> 12.49 _____ 1.24 | <b>12</b> 16.64 _____ 16.46 |

### Challenge

What number am I?

I have 2 digits before the decimal point and 2 digits after.  
 The sum of the first two digits equals the sum of the  
 second two. I have no zeros. The sum of all my digits is  
 16. Investigate how many different numbers I could be.



# CHAPTER 11

## Place Value and Decimals

Millions			Thousands						Decimal fractions				
hundreds	tens	ones	hundreds	tens	ones	hundreds	tens	ones	tenths	hundredths	?	?	?

The value of a digit depends on its place in a number.

What is the value of the 4 in each of these numbers?

Write your answer in numbers and words.

1 6492

2 564.21

3 43 210

4 638.49

5 849.3

6 784 963

7 38.94

8 4 287 651.86

9 6 468 911

10 649 812 389.6

In writing your answers in numbers you will have used a lot of zeros.

11 Explain why you use a zero.

Do you need these zeros? Answer yes or no.

12 6057

13 07938

14 65.09

15 184.90

### Challenge

What do you think the value of the ? places would be in the table at the top of the page.

 **Working with Decimals**

Put a decimal point into these numbers so that the '6' is in the tens place.

- 1 a 59635                      b 6841                      c 39516825  
d 398613                      e 98365148              f 935321652

Put a decimal point into these numbers so that the 3 is in the tenths place.

- 2 a 2498305                      b 6738                      c 35005  
d 57301                          e 19879034              f 2893518

Find the totals of these numbers.

Write your answer in numbers and words.

- 3 a seven hundred and thirty-three point six seven and eight hundred and forty point eight.  
b two thousand and sixty-four point eight two and three thousand, six hundred point seven five.  
c fifty-three thousand, five hundred and eighty point zero six and two hundred and seventy-three point four four.







## Decimal Problems

- 1 Joshua is saving for a surfboard. He has \$216.55 in his bank account. For his birthday he is given \$75.
- a How much money does he have now?  
The board he wants costs \$350.
- b How much more does he need to save?



- 2 The odometer in Rangi's car read 76 905.8km. The family went on holiday and when they came home the odometer read 77 762.3km. How far had the family travelled?



- 3 At the interschool athletics, four schools entered a team in the relay race. The table below shows the times for each of the runners in seconds.
- a Which school won the relay race?
- b Write the teams in order — 1st, 2nd, 3rd, 4th — with the total time taken for each.

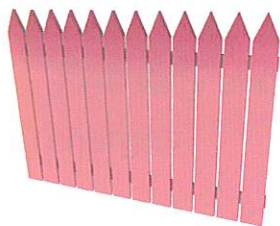
	Glenholme	Westbrook	Malfroy	Otonga
Runner 1	11.58	11.56	10.33	11.15
Runner 2	10.24	11.52	12.22	11.35
Runner 3	11.35	10.44	11.27	11.28
Runner 4	11.06	11.04	10.45	10.59

## More-Challenging Problems with Decimals

Often if you change the numbers in a problem for simpler numbers, the operation you need to solve the problem becomes clearer. Once you know the operation to use, use a calculator to find the answer.

- 1 Mrs Collins bought 5.5m of material for \$38.50.  
How much was the material per metre?

- 2 The supermarket was selling salmon at \$6.50 per 250g. The fish shop was selling salmon at \$25.00 per kg.  
Which shop was giving the better deal?



- 3 Mr Tui was making a fence. Each post was 1.25m high. He bought lengths of wood 5m long. How many lengths does he need to buy to make 56 fence posts?

- 4 A plastic bucket weighs 0.85kg.  
12 plastic buckets weigh the same as 8 metal buckets. How heavy is a metal bucket?



### Challenge

Keep a record of where you see decimals being used in real life.



# Mini Project

## At the Airport

The Te Uru family were going on holiday. The airline allowed them 22kg of luggage each, plus a 7kg carry-on bag. This is what their luggage weighed.

Dad Te Uru



Mum Te Uru



Sam Te Uru



Linda Te Uru





- 1 What weight of luggage does each person have?
- 2 What total weight of luggage is the family allowed?
- 3 What is the total weight of their luggage?
- 4 Can you help the Te Uru family to sort out which piece of luggage each person should carry on?
- 5 What weight of luggage are they checking in?

**On holiday:**

- 6 Dad bought 5 bottles of wine and packed them in his large case. Each bottle weighs 1.2kg. How heavy will his case be now? What excess charge would the family have to pay on the way home?
- 7 If Linda lost her middle-weight bag, could the family avoid paying excess baggage charges?



**Excess Baggage Charge  
\$5 per kg**

**Challenge**

Think about: where should Dad pack the wine?

