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CAMBRIDGE Primary Mathematics

Learner's Book 4

Emma Low & Mary Wood



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CAMBRIDGE Primary Mathematics

Learner's Book 4

Emma Low & Mary Wood

Introduction

Welcome to Stage 4 of Cambridge Primary Mathematics. We hope this book will show you how interesting Mathematics can be and make you want to explore and investigate mathematical ideas.

Mathematics is everywhere. Developing our skills in mathematics makes us better problem-solvers through understanding how to reason, analyse and reflect. We use mathematics to understand money and complete practical tasks like cooking and decorating. It helps us to make good decisions in everyday life.

In this book you will work like a mathematician to find the answers to questions like these:

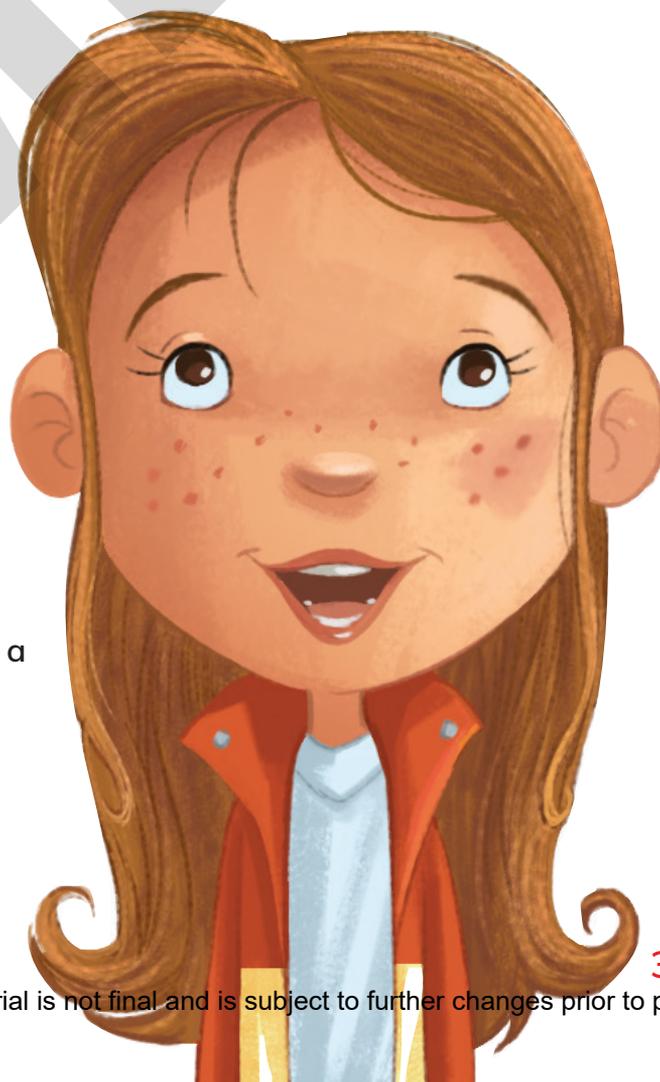
- What are negative numbers and when are they used?
- How can you quickly find out if 1435 is in the 25 times table?
- Which is bigger: half a cake or 50 percent of a cake?
- What might you be doing at the time 23:30?
- What shape is a cone?
- What is a dot plot?
- What comes between the points North, East, South and West on a compass?

Talk about the mathematics as you explore and learn. This helps you to reflect on what you did and refine the mathematical ideas to develop a more effective approach or solution.

You will be able to practise new skills, check how you are doing and also challenge yourself to find out more. You will be able to make connections between what seem to be different areas of mathematics.

We hope you enjoy thinking and working like a mathematician.

Emma Low and Mary Wood



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How to use this book



In this book you will find lots of different features to help your learning.

Questions to find out what you know already.

Getting started

- Write the term-to-term rule for finding the next term in these sequences.
 - 185, 180, 175, ...
 - 235, 245, 255, ...
 - 901, 801, 701, ...
- Read these numbers to your partner, then write each number in words.
 - 601
 - 299
 - 111
- Write the number you make when you put the place-value cards together.
 -

What you will learn in the unit.

We are going to ...

- count on and back in steps of tens, hundreds and thousands starting from any number
- count back through zero to include negative numbers such as -2
- recognise linear sequences and non-linear sequences

Important words that you will use.

equivalent fraction
proper fraction

Step-by-step examples showing a way to solve a problem.

Worked example 2

Written method of addition
Calculate $235 + 174$.

Estimate $200 + 200 = 400$	Start with an estimate.
$235 = 200 + 30 + 5$	
$174 = 100 + 70 + 4$	Decompose the numbers.
$235 + 174 = 300 + 100 + 9$	Add the hundreds, tens and ones together.
$= 409$	Then compose the parts.

Answer: 409



There are often many different ways to solve a problem.

These questions will help you develop your skills of thinking and working mathematically.

2 Choose any two of these three sequences. How are they similar to each other and how are they different?

2, 4, 6, 8, ...
2, 5, 8, 11, ...
3, 5, 7, 9, ...

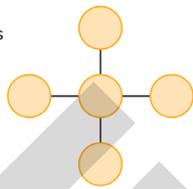




An investigation to carry out with a partner or in groups. Where this icon appears , the activity will help develop your skills of thinking and working mathematically.

Think like a mathematician

Use each of the numbers 3, 4, 5, 6 and 7 to complete the cross pattern. The total going across must be the same as the total going down.




Questions to help you think about how you learn.

Number lines are useful for calculating and showing connections between values. Sometimes one is drawn for you, but sometimes you can draw your own to help.

Look at the questions in the exercise and write down how you have used number lines to help you.

This is what you have learned in the unit.

Look what I can do!

- I can find a missing number represented by a symbol.
- I can find a missing operation sign represented by a symbol.

Questions that cover what you have learned in the unit.

Check your progress

- 1 Write the missing number.
 $100 - \square = 58$
- 2 Write the missing number.
 $2 + 20 + \square = 100$
- 3 A total of 245 chairs are needed for a school performance. 169 chairs are already in place. How many chairs need to be put in place?

At the end of several units, there is a project for you to carry out using what you have learned. You might make something or solve a problem.

> Project 1

Deep water

Here is a picture of a bridge spanning part of the sea at an estuary. The scale marked on one of the bridge supports shows the level of the water. The zero on the scale is at the base of the bridge. At the moment the water is 2 metres below the base of the bridge, shown by the -2 on the scale.



If the water level rose and reached the base of the bridge, how much would it have risen by?

If the water level then rose again and reached the number 2 on the scale, how much more would it have risen by? How much would it have gone up by in total?

1

Numbers and the number system

Getting started

- 1 Write the term-to-term rule for finding the next term in these sequences.
- a 185, 180, 175, ... b 235, 245, 255, ... c 901, 801, 701, ...

- 2 Read these numbers to your partner, then write each number in words.

a 601 b 299 c 111

- 3 Write the number you make when you put the place-value cards together.

a

b

- 4 Copy and complete these number sentences.

a $562 = \square + 60 + \square$

b $305 = 300 + \square$

- 5 Write the missing numbers.

a $16 \times 10 = \square$

b $56 \times \square = 560$

1 Numbers and the number system

This unit is all about our number system. You will look at linear sequences and non-linear sequences, negative numbers, multiplying and dividing by 10 and 100, and place value.

Imagine you save \$2 each week.

Can you write a number sequence for how much you have at the end of each week?

You add the same amount each time, so this is a linear sequence.

The term-to-term rule is 'add 2'.



If you save a different amount each time, the sequence will be non-linear.

One of the main ideas in place value is that the value of a digit depends on its position in the number.

Think about what the digit 7 is worth in \$7 and \$70.

Do you have enough money to buy the bike?



There are \$7 in the bag



The bike costs \$70

Think about the numbers 126 and 162.

What is the value of the digit 2 in each number?

> 1.1 Counting and sequences

We are going to . . .

- count on and back in steps of tens, hundreds and thousands starting from any number
- count back through zero to include negative numbers such as -2
- recognise linear sequences and non-linear sequences
- extend sequences and describe the term-to-term rule
- recognise and extend patterns that represent square numbers.

You will continue counting forwards and backwards in steps of constant size and you will start to use negative numbers.

Around the coasts of Antarctica temperatures are between -10°C and -30°C .

Try counting back in tens starting at 30 and ending with -30 .



difference
linear sequence
negative number
non-linear sequence
rule sequence
spatial pattern
square number
term
term-to-term rule

Worked example 1

Carlos writes a number sequence.

The first term in his sequence is 8.

He uses the rule 'subtract 2' to work out the next term.

What is the fifth term in his sequence?

$$8 \xrightarrow{-2} 6 \xrightarrow{-2} 4 \xrightarrow{-2} 2 \xrightarrow{-2} 0$$

Start with 8 and subtract 2 each time until you have five terms.

Answer: The fifth term is 0.

Worked example 2

The numbers in this sequence increase by 50 each time.

$$60 \xrightarrow{+50} 110 \xrightarrow{+50} 160 \xrightarrow{+50} \dots$$

What is the first number greater than 1000 that is in the sequence?

Explain how you know.

60, 110, 160, 210, 260, ...

Write down the first few terms.

(You could write down all the terms in the sequence, but it would take a long time.)

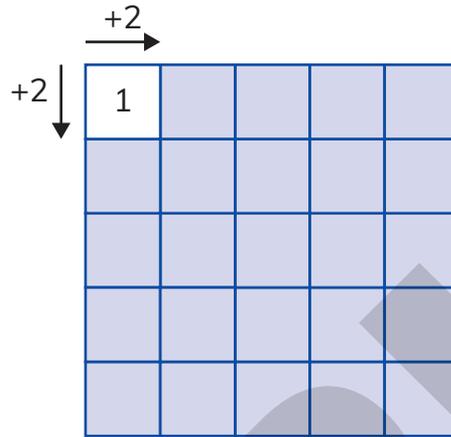
Answer: The terms all end in 10 or 60
so the first number greater than 1000 is 1010.

Exercise 1.1

- 1 a Mia counts on in steps of 100
She starts at 946
Write the next number she says.
- b Kofi counts back in steps of 100
He starts at 1048
Write the next number he says.
- c Bibi counts on in steps of 1000
She starts at 1989
Write the next number she says.
- d Pierre counts back in steps of 1000
He starts at 9999
Write the next number he says.
- e Tara counts back in ones.
She counts 3, 2, 1, 0
Write the next number she says.

1 Numbers and the number system

- 2 Copy and complete this square using the rule 'add 2 across and add 2 down'.
What do you notice about the numbers on the diagonal?
Discuss with your partner.



Draw two more 5 by 5 squares and choose a rule using addition.
Predict what the numbers on the diagonal will be before you complete the squares.

- 3 Choose any two of these three sequences.
How are they similar to each other and how are they different?

2, 4, 6, 8, ...

2, 5, 8, 11, ...

3, 5, 7, 9, ...

- 4 Look at these sequences.
Which could be the odd one out? Explain your answer.

13, 16, 19, 22, ...

8, 11, 14, 17, ...

-5, -2, 1, 4, ...

9, 12, 15, 18, ...

16, 19, 22, 25, ...

Think about your answers to questions 2 and 3.
Are there other possible answers?

5 Use different first terms to make sequences that all have the term-to-term rule 'add 3'. Can you find a sequence for each of the following?

- a Where the terms are all multiples of 3.
- b Where the terms are not whole numbers.
- c Where the terms are all odd.
- d Where the terms include both 100 and 127.

6 Abdul makes a number sequence.

The first term of his sequence is 397.

His term-to-term rule is 'subtract 3'.

Abdul says, 'If I keep subtracting 3 from 397 I will eventually reach 0.'

Is he correct?

Explain your answer.

7 Which sequences are linear and which are not?

Write the next term for each sequence. Explain your answers to your partner.

- a Add five: 4, 9, 14, ...
- b Subtract four: 20, 16, 12, ...
- c Add one more each time: 2, 3, 5, ...
- d Multiply by three: 2, 6, 18, ...
- e Subtract one less each time: 50, 41, 33, ...
- f Divide by two: 32, 16, 8, ...
- g Multiply each counting number by itself: 1, 4, 9, ...

Think like a mathematician

These sets of beads have **consecutive** numbers in the circles.

The numbers add up to the number in the square.

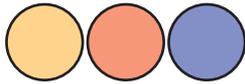
Example:



Continued

Complete these sets of beads.

a



27

b



25

Tip

Consecutive numbers are next to each other.

For example, 3, 4, 5 and 6.



Describe to a partner how to find the middle number of each set of beads.

Look what I can do!

- I can count on and back in steps of different sizes.
- I can extend linear sequences and describe the term-to-term rule.
- I can recognise non-linear sequences.
- I can extend patterns that represent square numbers.

> 1.2 More on negative numbers

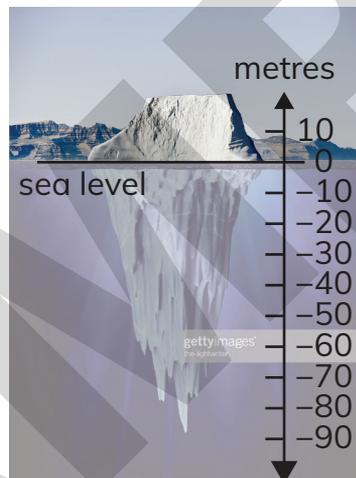
We are going to . . .

- read and write numbers less than zero, for example -6 is negative six
- understand how negative numbers are used in the real world, for example to describe a very cold temperature or a position below sea level.

In this section, you will use negative numbers in contexts such as temperature or being above or below sea level.

An iceberg is ice that has broken off a glacier and is now floating. There is much more ice below sea level than there is above sea level.

temperature
zero

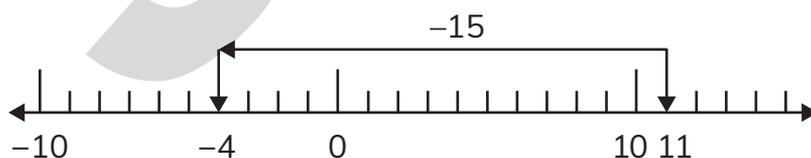


Worked example 3

The temperature in England is 11°C .

The temperature in Iceland is 15° colder.

What is the temperature in Iceland?



Answer: The temperature in Iceland is -4°C .

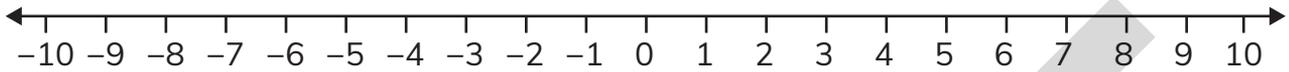
Draw a number line to help.

Start at 11.

The temperature is colder, so you jump back 15 places.

Exercise 1.2

1 Look at the number line.



Write where you would land on the number line after these moves.

a start count on

-5

1

b start count back

-2

4

c start count on

-3

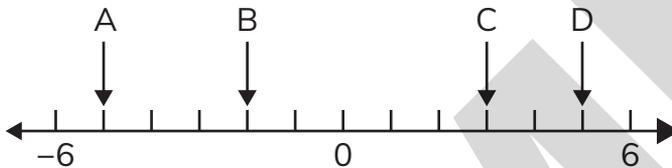
3

d start count back

6

9

2 Here is a number line.

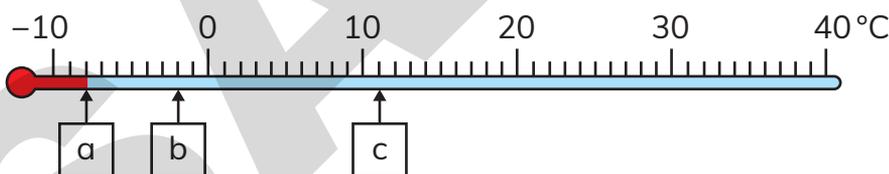


a Which numbers do the arrows A, B, C and D point to?

b Which letter shows the position of a number greater than -4 and less than 0 ?

3 Look at this thermometer.

What numbers are the arrows pointing to at a, b and c?



4 Which temperature is the coldest?

-6°C 0°C 1°C -2°C

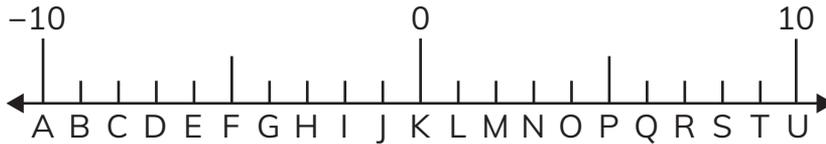
Tip

Use the thermometer in question 3 to help you.



- 5 The temperature in a town one day was 5°C .
The temperature dropped by 9°C overnight.
What was the lowest night-time temperature?

- 6 The letters on the number line are in the place of numbers.



Copy and complete the table to solve the puzzle and find out where emperor penguins live.

-10	3	9	-10	7	-8	9	-2	-8	-10

- 7 Marcus says, 'Negative 5°C is warmer than -4°C because 5 is bigger than 4.'

What mistake has Marcus made?

How can you help her correct this mistake?

Negative 5°C is warmer than -4°C because 5 is bigger than 4.



- 8
- a What temperature is 6 degrees warmer than -4°C ?
 - b What temperature is 5 degrees less than 1°C ?
 - c What temperature is 3 degrees warmer than -2°C ?
 - d What temperature is 3 degrees cooler than 0°C ?
 - e What temperature is 5 degrees higher than -1°C ?

Number lines are useful for calculating and showing connections between values. Sometimes one is drawn for you, but sometimes you can draw your own to help.

Look at the questions in the exercise and write down how you have used number lines to help you.

Think like a mathematician

The coldest place where people live is Oymyakon in Siberia.

In 1933 the temperature fell to -67°C .

It was so cold that people's eyelashes froze.

- Investigate the summer and winter temperatures in different places. Order the temperatures you find starting with the coldest.
- Make a poster to show your findings.
- Find examples of temperatures in magazines or on the internet and add them to your poster. You can include maps, pictures and graphs.



Compare your poster to others in your class.

What is similar and what is different?

How could you improve the mathematical content?

How could you improve the presentation?

Look what I can do!

- I can read and write whole numbers less than zero, for example -6 is negative 6.
- I can understand how negative numbers are used in the real world, for example to describe a very cold temperature.

> 1.3 Understanding place value

We are going to . . .

- read and write whole numbers greater than 1000
- say the value of each digit in any whole number and explain how the position of a digit affects its value
- multiply and divide whole numbers by 10 and 100 and understand how the digits move
- **compose (put together) and decompose (split) numbers.**

In this section, you will work with bigger numbers including thousands, ten thousands and hundred thousands. You will also multiply and divide whole numbers by 10 and 100.

compose
decompose
equivalent
hundred thousand
million
place holder
regroup
ten thousand
thousand

Worked example 4

Look at the number 829.

- What digit is in the tens place?
- What is the value of the 8 in this number?

100s	10s	1s
8	2	9

Use a place value table to help you.

Answer

- 2
- eight hundreds (or 800)

Remember to write the number of hundreds.

Exercise 1.3

1 a What is the value of the digit 9 in 950 302?

b What is the value of the digit 5?

2 Mia is thinking of a 5-digit whole number.

She says, 'It has a 2 in the ten thousands place and in the tens place.'

It has a 5 in the thousands place and in the ones place.

It has a 0 in the hundreds place.'

What number is Mia thinking of?

--	--	--	--	--

Write your number in words.

3 Decompose these numbers by copying and filling in the missing numbers.

a $805\,469 = \square + 5000 + \square + \square + 9$

b $689\,567 = 600\,000 + \square + \square + 500 + \square + \square$

c $508\,208 = \square + \square + \square + \square$

Discuss your answers with a partner.

4 Bruno says, 'The largest 5-digit number is 1 less than a hundred thousand.'

Is Bruno correct?

Explain your answer.

5 Which number sentence has a different missing number? What is it?

$\square \times 100 = 30\,000$

$3 \times 100 = \square$

$30\,000 \div 100 = \square$

$\square \div 10 = 30$

$\square \times 100 = 3000$

$\square \times 10 = 3000$

6 Calculate:

a 67×10

b $40 \div 10$

c $3600 \div 100$

d 415×10

e $350 \div 10$

f 35×100

- 7 If you multiply 606 by 10, what changes and what stays the same?
Discuss your answer with your partner.

Think like a mathematician

Digital sum

The digits in the number 15 total 6 ($1 + 5 = 6$).

- Find all the whole numbers that have digits with a total of 6. Do not include zero in any of your numbers.
- What is the largest number?
- What is the smallest number?

Compare your solution with your partner's solution.

Did you get the same answer? Did you use the same method?

Did you find all the 2-digit numbers, then 3-digit numbers and so on?

How could you improve your method?

Look what I can do!

- I can read and write whole numbers greater than 1000.
- I can say the value of each digit in any whole number.
- I can multiply and divide a whole number by 10 and 100.

Check your progress

- 1 The term-to-term rule for this sequence of numbers is add three each time.
401, 404, 407, 410, 413, 416, 419, ...

The sequence continues in the same way.

Which of these numbers do not belong to the sequence?

422

428

430

434

- 2 The numbers in this sequence increase by 50 each time.

$$70 \xrightarrow{+50} 120 \xrightarrow{+50} 170 \xrightarrow{+50} \dots$$

What is the first number in the sequence that is greater than 500?

- 3 Here are three different sequences.

6, 8, 10, 12, ...

8, 11, 14, 17, ...

1, 3, 5, 7, ...

Choose two of the sequences.

In what ways are the two sequences the same?

In what ways are the two sequences different from the third sequence?

- 4 The temperature in Iceland is -1°C .

The temperature in Mongolia is 31°C colder.

What is the temperature in Mongolia?

- 5 Use digits to write these numbers.

a Three hundred and thirty-five thousand, two hundred and seventy-one.

b One hundred and five thousand and fifty.

c One hundred and twenty thousand, two hundred and two.

- 6 Write these numbers in words.

a 307 201

b 577 006

c 790 320

- 7 Martha scored 1646 points in a computer game.

Which of the following is not a correct representation of her score?

A $1000 + 600 + 40 + 6$

C $1000 + 606 + 4$

B $1000 + 600 + 46$

D $1000 + 606 + 40$

Continued

8 Which of these numbers is 100 times larger than five hundred and fifty-five?

555

5550

55 500

555 000

9 Copy and complete these number sentences.

a $\square \div 10 = 54$

b $307 \times \square = 3070$

c $\square \times 100 = 6000$

d $3400 \div \square = 34$

10 a What temperature is 5° warmer than -1°C ?

b What temperature is 10° cooler than 0°C ?

gettyimages
discan

> Project 1

Deep water

Here is a picture of a bridge spanning part of the sea at an estuary. The scale marked on one of the bridge supports shows the level of the water. The zero on the scale is at the base of the bridge. At the moment the water is 2 metres below the base of the bridge, shown by the -2 on the scale.



If the water level rose and reached the base of the bridge, how much would it have risen by?

If the water level then rose again and reached the number 2 on the scale, how much more would it have risen by? How much would it have gone up by in total?



The level of the water is checked at midday each day. The picture above shows the water level at midday on Monday, when it is 1 metre below the base of the bridge. There is a flood overnight, and by midday on Tuesday the water level has risen by 2 metres. On Wednesday the flood has finished, and the water level has fallen by 4 metres from where it was on Tuesday.

Where is the water level at midday on Wednesday? Can you draw a picture to show what this would look like on the scale?

2

Time and timetables

Getting started

1 Here are seven units of time.



Copy and complete each sentence using one of the words.

- a We measure our age in _____.
- b I sleep about 8 _____ each day.
- c A sports match lasts for 90 _____.

2 Which of these times are equivalent to the one shown on the clock?



3 Here is part of a bus timetable.

High Street	3.00	4.00
Church Lane	3.05	4.05
Shopping Centre	3.20	4.20
Swimming Pool	3.35	4.35

A bus leaves High Street at 3.00.

What time is the bus at Church Lane?

4 Copy and complete the sentences using one of these words.



- a April is 3 _____ before July.
- b 5:00 is 5 _____ after midnight.

2 Time and timetables

What do you use to tell the time?

Do you use an analogue clock or watch, a digital clock or watch or something else?

The ancient Egyptians measured time using shadows. You can make a simple shadow clock in the playground. Make sure you choose a sunny day!



Do you know of any other timekeeping devices? Try to find out about some.

There are lots of different ways to read and record the time when something happens. In stage 3, you used only 12-hour times. In this unit, you will learn about the 24-hour clock.

In stage 3 you used:

- twenty-five to nine
- twenty-five minutes to nine
- 8:35.

Stage 4 introduces you to:

- 8.35 a.m. or 08:35
- 8.35 p.m. or 20:35.



You will also learn more about timetables including those that use the 24-hour clock. You will use timetables to plan journeys and work out how long a journey lasts.

> 2.1 Time

We are going to . . .

- read and tell the time on digital and analogue clocks
- use a.m., p.m., and 12-hour and 24-hour clock notation with digital and analogue clocks.

Where have you seen clocks like these?



An analogue clock has two scales – one from midnight to midday and the other from midday to midnight.



A digital clock shows a time of 13:26 which is 1.26 p.m.

a.m.
analogue clock
digital clock
hour
minute
p.m.
second

Worked example 1

The clock shows a time in the evening.

- Show the same time on a 24-hour digital clock.
- Write different ways the time could be recorded.



Answer:

- The clock shows 6:50 in the evening.
In 24-hour digital time this is 18:50.
- 6.50 p.m.
Ten to seven in the evening.
Ten minutes to seven in the evening.

When recording time using the 24-hour clock you will always use four digits.

To change an evening time to 24-hour time you have to add 12 to the hours.

$$6 + 12 = 18$$

You use 'p.m.' to show that the time is in the evening.

Exercise 2.1

- 1 Copy and complete the following:
 - a There are ____ days in September.
 - b There are ____ minutes in 1 hour.
 - c There are ____ months in a year.
 - d There are ____ seconds in 1 minute.
- 2 Write the missing numbers.
 - a 3 minutes = seconds
 - b 5 hours 30 minutes = minutes
 - c 7 weeks = days
 - d months = 3 years
 - e hours = 2 days 6 hours
 - f minutes = $7\frac{1}{2}$ hours

Check your answers with your partner. Did you get the same answers to question 2? How did you work out the number of minutes in $7\frac{1}{2}$ hours? Did your partner use the same method?

- 3 Ali went swimming at 5.15 p.m.
Which clock shows the time Ali went swimming?



A



B



C



D

- 4 Copy and complete the table to show the time using a.m. and p.m.
One has been done for you.

ten past four in the afternoon	4.10 p.m.
quarter past seven in the morning	
quarter to ten at night	
twenty minutes past three in the afternoon	

- 5 Petra looks at the clock in the classroom. She says, 'It is almost lunchtime.'



Write the time using a.m. or p.m.

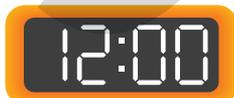
- 6 Chen goes swimming at ten past five in the afternoon.
Which digital clock shows when Chen goes swimming?



- 7 A wall clock shows this time.



Which two digital clocks could show the same time as the wall clock?



2 Time and timetables

- 8 Ava converts 9 p.m. to a 24-hour clock time.
Her answer is 19:00.
Ava's answer is wrong.
Correct Ava's answer. Explain what she did wrong.

Think like a mathematician

Digital clocks

Milly dropped her digital clock. When she picked it up she could not tell which way up it was.



- Write in words the two different ways of saying what the time is.
- Write three other times that look the same on a digital clock whichever way up it is.

1 2 3 4 5 6 7 8 9 0

Use these digital numbers to help you.

Look what I can do!

- I can read and tell the time on digital and analogue clocks.
- I can use a.m., p.m., 12-hour and 24-hour clock notation with digital and analogue clocks.

Stock Photo : Clock Face Showing M

> 2.2 Timetables and time intervals

We are going to . . .

- read a timetable to solve problems
- choose and use suitable units to calculate time intervals.

It is important to know how to tell the time and be able to read a calendar and a timetable. It can help you to catch a train, bus, plane or boat on time. For example, it is no good arriving at the station just as the train is leaving.

Understanding time and timetables helps you to know if you will get to an important event on time.



Worked example 2

Here is a coach timetable.

Which coach completes the journey to Corbury in the shorter time?

Anbury	09:09	10:10
Babury	09:24	10:26
Corbury	09:45	10:48

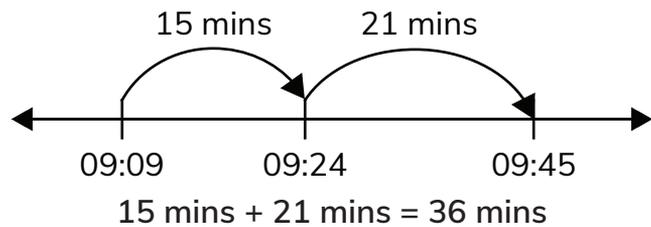
calendar
leap year
time interval
timetable

Use a time line.

You can work out the time taken between each stop and add them up.

Or you can work out the time taken between the start and the end.

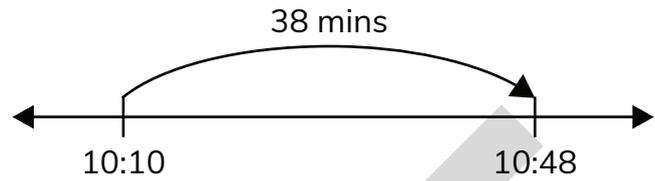
Compare the times to decide which coach takes the shorter time.



Continued

The 09:09 coach takes 36 minutes.
The 10:10 coach takes 38 minutes.

Answer: The 09:09 coach takes the shorter time.



Exercise 2.2

- 1 Heidi went to her friend's house. She arrived at 2.00 p.m. and left at 2.45 p.m. How long was Heidi at her friend's house?
- 2 The swimming pool opens at 8.00 a.m. It closes at 6.00 p.m. How long is the pool open?
- 3 The time is 9.25 a.m. Haibo says, 'The time is closer to 09:00 than to 10:00.' Explain why Haibo is correct.
- 4 These are the opening times of a museum.

Monday	Closed
Tuesday to Friday	10.30 a.m. to 5.30 p.m.
Saturday	9.00 a.m. to 6.00 p.m.
Sunday	11.00 a.m. to 4.00 p.m.

- a How many hours is the museum open on Wednesday?
 - b Zina arrived at the museum at 3.15 p.m. on Sunday. How long could she stay before closing time?
- 5 Here is part of a bus timetable from Dondale to Bodmin.
- a How many minutes does it take the 13:02 bus from Dondale to reach Bodmin?
 - b Magda is at Bridgetown at 1 p.m. What is the earliest time she can reach Treham? Check your answers with your partner.

Dondale	12:12	12:31	12:48	13:02
Knightsbridge	12:21	12:38	12:55	13:11
Bridgetown	12:38	12:52	13:11	13:28
Treham	12:44	13:00	13:17	13:36
Bodmin	13:01	13:17	13:34	13:53



Stock Photo : School girl

gettyimages rubberball 25

6 The Golden Gate Bridge in San Francisco was opened on 27 May 1937.



Jyoti visits the bridge on 27 May 2020.

How many years has the bridge been open?

7 Here is a timetable for Class 4 on Tuesday.

09:00	09:15	09:35	10:35	10:50	11:50	12:35	13:30	14:30	14:45	15:30
Arrival	Assembly	Spanish	Break	Maths	History	Lunch	Science	Break	Art	

- a How long does Assembly last?
- b How long does morning break last?
- c Hassan’s favourite lessons are Maths and Science. How long is spent, in total, in these two lessons?

Questions 4, 5 and 7 use different types of timetable. Which one did you find easiest to use? Why?

2 Time and timetables

- 8 a Leila goes swimming each day from Monday 2 December to Friday 6 December.
How many days does she go swimming?
- b Ahmed joins a gym club from 1 April to 30 June.
How many months is this?
- c Ros works on a project from Wednesday 11 September to Tuesday 8 October.
How many weeks does she work on the project?

Look what I can do!

- I can read a timetable to solve problems.
- I can choose and use suitable units to calculate time intervals.

Check your progress

- 1 Here is a digital clock.



What time is the same as that shown on the clock?

7.07 a.m.

7.07 p.m.

5.07 a.m.

5.07 p.m.

- 2 Write quarter to twelve in the **morning** as a digital time.

- 3 Here are five times.

6.45 a.m.

Ten minutes to eight

15:30

9.30 a.m.

quarter past seven

Which time is the 'odd one out'? How do you know?

Continued

4 What are the missing numbers?

a 60 months = years

b 72 hours = days

c 84 days = weeks

5 Bruno leaves school at ten past three. He arrives home at ten to four.
How long does it take him to get home?

6 Use the calendar to answer these questions.

- a What day is 13 November?
- b What is the date of the first Friday in the month?
- c What is the date of the last Saturday of the month?
- d The gym club meets on the first and third Wednesday.

NOVEMBER						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

What are the dates of the November meetings?

7 The timetable shows the television programmes one morning.

- a Gemma turns the television on at 7.45 a.m.
How long does she have to wait for the Weather programme?
- b The travel programme lasts 10 minutes.
What time does it finish?

07:30	News
07:55	Weather
08:00	News
08:15	Sport
08:25	Weather
08:30	News
08:45	Travel

8 Use the bus timetable to answer the questions that follow.

Oldcastle	07:09	07:53	11:10	13:12	15:13	18:04	19:10
Diddlington	07:21	08:05	11:22	13:24	15:25	18:16	19:22
Lenford	07:44	08:28	11:45	13:47	15:48	18:39	19:45

- a How long does it take to travel from Oldcastle to Diddlington?
- b How long does it take to travel from Oldcastle to Lenford?
- c What is the latest bus you can catch in Oldcastle if you want to be in Diddlington by 3.30 p.m.?

Simon McGill

> Project 2

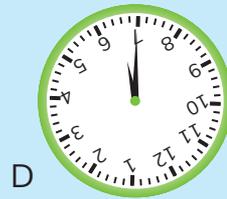
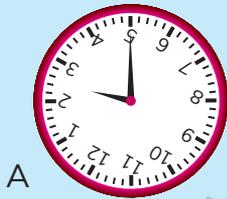
Rolling clock

The picture shows a clock rolling down a slope.



Here are some pictures of different clocks that are on the slope.

What times do they show? How do you know?



Here are four more rotated clocks. They show 3 o'clock, 10 minutes past 10, 20 minutes to 4 and half past 11.



Which is which?

How do you know?

3

Addition and subtraction of whole numbers

Getting started

You can use any method to answer these questions. Remember to estimate the size of your answer before you calculate it.

Show all your working.

- 1 Calculate $42 + 36$.
- 2 Find the difference between 95 and 9.
- 3 Find the total of 65 and 29.
- 4 Copy the sorting diagram and write each of these numbers in the correct place.

7 13 12 25 8

	Less than 10	Greater than 10
Even		
Odd		

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Shaun Botterill

25 YEARS

3 Addition and subtraction of whole numbers

You add and subtract in your everyday life.

Think about your birthday. Every year you add 1 to your age.

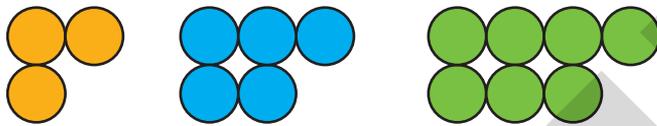
This is addition.

Think about a football team. If a player commits a foul they may be given a red card and sent off the field, meaning there is 1 less player on the field. This is subtraction.

Can you think of occasions where you have added or subtracted today?
What were you doing?

Look at these 'L shapes'.

Each one is made from an odd number of dots.



The shapes show us that if we divide an odd number by 2 there is always 'a bit left over'.

Think about what happens when you add and subtract odd and even numbers. Do you end up with odd or even numbers?

In this unit you will also use a symbol to represent a missing number or operation in number sentences.

Can you work out what the square and circle represent?

$$3 + \square = 15$$

$$10 \circ 2 = 20$$

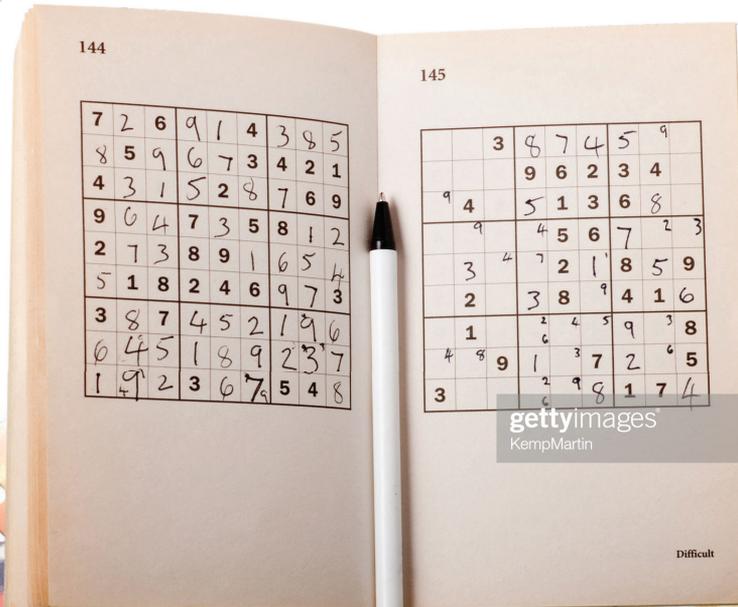
> 3.1 Using a symbol to represent a missing number or operation

We are going to . . .

- use a symbol to represent a missing number or operation sign in an addition or subtraction calculation.

Many people, both young and old, enjoy solving number puzzles. Very young children start with simple jigsaws, and adults enjoy harder puzzles.

symbol



In this unit you will solve missing number puzzles.

You can use a symbol to show a missing number.

For example, $30 - \bigcirc = 27$ or $30 - \square = 27$.



Worked example 1

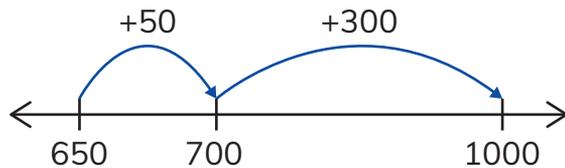
Write the missing number.

$$650 + \square = 1000$$

You can read $650 + \square = 1000$ as

'I have 650. How many more do I need to make 1000?'

Method 1



Use a number line to count on from 650.

Remember, the larger the jump the more efficient the method.

Method 2

$$1000 - 650 = 350$$

You can rewrite $650 + \square = 1000$ as a subtraction: $1000 - 650 = \square$

Addition and subtraction are inverse operations.

Method 3

$$650 + \boxed{350} = 1000$$

You can work it out mentally using known facts.

Answer: 350

Exercise 3.1

1 Write the missing numbers.

a $15 + 29 = \square$

b $35 - 19 = \square$

c $\square - 14 = 8$

d $\square + 6 = 30$

e $12 + \square = 25$

f $30 - \square = 16$

2 Copy and complete the number sentence.

$$\boxed{5} \boxed{\square} + \boxed{\square} \boxed{5} = 100$$

3.1 Using a symbol to represent a missing number or operation

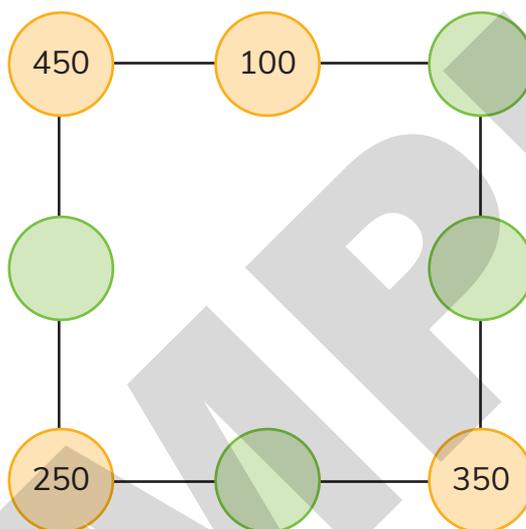
3 Write the missing numbers.

a $1 + 10 + \square = 100$

b $57 + \square = 120$

c $50 - \square = 31 + 10$

4 In this diagram, the numbers on three circles in a straight line add up to 1000. Copy and complete the diagram.



Check your answer with your partner.

In this question, you can choose different starting points.

How did you decide which number to find first?

Did your partner do the same?

Think about your method. Was it the best method?

Did you remember to check your answer?

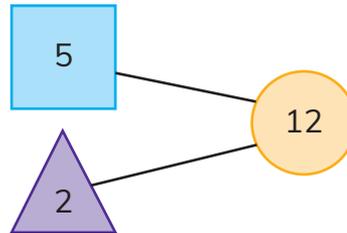
5 Find the missing operation signs.

a $28 \bigcirc 72 = 100$

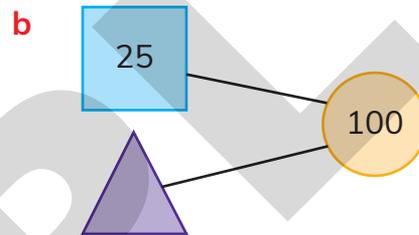
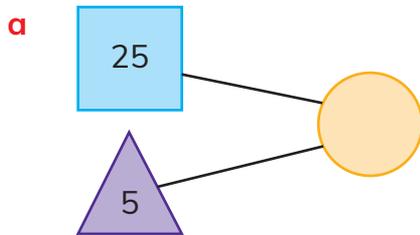
b $55 = 70 \bigcirc 15$

3 Addition and subtraction of whole numbers

- 6 In this diagram the rule is:
'Double the number in the square and add the number in the triangle to make the number in the circle'.



Use the same rule to find these missing numbers.



7 $\square + \triangle + \bigcirc = 10$

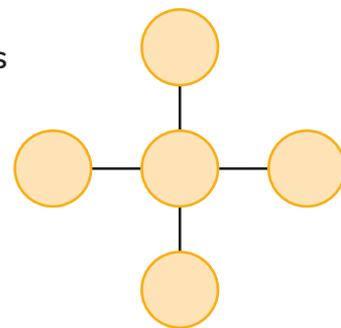
What numbers could \square , \triangle and \bigcirc represent?

Discuss your answer with your partner. You may have different answers.

Can you think of other possible answers?

Think like a mathematician

Use each of the numbers 3, 4, 5, 6 and 7 to complete the cross pattern. The total going across must be the same as the total going down.



Look what I can do!

- I can find a missing number represented by a symbol.
- I can find a missing operation sign represented by a symbol.

> 3.2 Addition and subtraction of whole numbers

We are going to . . .

- compose (put together) whole numbers
- decompose (split) a whole number into parts
- regroup a number as part of a calculation
- choose an appropriate mental or written calculation to add or subtract whole numbers
- estimate the size of an answer before doing the calculation.

When you go shopping you spend money. You use addition to work out how much to pay. You use subtraction to work out how much change you should get.

In this section, you will estimate and then add and subtract pairs of 2-digit numbers mentally. You will learn about different written methods for addition and subtraction.

compose
decompose
difference
regroup



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Worked example 2**Written method of addition**Calculate $235 + 174$.Estimate $200 + 200 = 400$

$$235 = 200 + 30 + 5$$

$$174 = 100 + 70 + 4$$

$$\begin{aligned} 235 + 174 &= 300 + 100 + 9 \\ &= 409 \end{aligned}$$

Answer: 409

Start with an estimate.

Decompose the numbers.

Add the hundreds, tens and ones together.

Then compose the parts.

Worked example 3**Written method of subtraction**

Calculate:

a $459 - 318$

b $424 - 179$

a $459 - 318$

Estimate $500 - 300 = 200$

$$459 = 400 + 50 + 9$$

$$318 = 300 + 10 + 8$$

$$\begin{aligned} 459 - 318 &= 100 + 40 + 1 \\ &= 141 \end{aligned}$$

Start with an estimate.

Decompose the numbers.

Subtract the hundreds, tens and ones.

Then compose the parts.

b $424 - 179$

Estimate $400 - 200 = 200$

$$424 = 300 + 110 + 14$$

$$179 = 100 + 70 + 9$$

$$\begin{aligned} 424 - 179 &= 200 + 40 + 5 \\ &= 245 \end{aligned}$$

Sometimes when you decompose, you need to regroup before you can subtract the hundreds, tens and ones.

$$\begin{array}{r} 400 + 20 + 4 \\ -100 + 70 + 9 \\ \hline \end{array} \longrightarrow \begin{array}{r} 300 + 110 + 14 \\ -100 + 70 + 9 \\ \hline \end{array}$$

Answers:

a 141

b 245

Exercise 3.2

- 1
 - a Calculate $607 - 391$.
 - b Find the sum of 376 and 219.
 - c What is the difference between 345 and 67?
 - d Subtract 385 from 721.

- 2 Rajiv says, 'If you add 6 to a number ending in 7 you will always get a number ending in 3.'
Is Rajiv correct?
Discuss your answer with a partner and write an explanation.

Tip

Remember to estimate before you calculate.



How did you decide whether Rajiv was correct or not?

How did you explain your answer?

Did you think about showing examples on a diagram like a hundred square or writing a list of examples in a systematic way?

How could you improve your answer?

- 3 Asif needs 355 chairs for a school concert. He has 269 chairs already. How many more chairs does he need?
- 4 The table shows the mass of some fruit and vegetables.

Fruit or vegetable	Mass
Apple	130 g
Banana	210 g
Carrot	90 g
Potato	240 g



How much do the apple and banana weigh altogether?