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CAMBRIDGE Primary Mathematics

Learner's Book 3

Cherri Moseley & Janet Rees

Introduction

Welcome to Stage 3 of Cambridge Primary Mathematics. We hope that this book will show you how interesting and exciting mathematics can be.

Mathematics is everywhere. Everyone uses mathematics every day. Where have you noticed mathematics?

Have you ever wondered about any of these questions?

- What can I do to help me make good estimates of quantities?
- What is the complement of a number?
- How are multiplication and division connected?
- What is an equivalent fraction?
- What do 'kilo', 'centi' and 'milli' mean?
- What are area and perimeter? How are they the same? How are they different?
- How do you read a timetable?
- What is a right angle?
- How can I explain to someone how to get to the park?
- How do you solve a mathematics problem?

You will work like a mathematician to find the answers to some of these questions. It is good to talk about the mathematics as you explore, sharing ideas. You will reflect on what you did and how you did it, and think about whether you would do the same next time.

You will be able to practise new skills and 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.

Cherri Moseley and Janet Rees



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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

1 Shapes can be grouped using their faces, vertices or edges. Draw arrows to sort these shapes into a group. Some will go into more than one group.

one or more curved surfaces

all faces rectangular

more than five vertices

What you will learn in the unit.

We are going to ...

- learn about prisms and find what is the same and what is different between prisms and pyramids
- build and name 3D shapes
- describe and sketch 3D shapes.

Important words that you will use.

buy change
decimal point
money notation
spend

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

Worked example 1

What is the value of the ringed digit in this 3-digit number?
4 $\text{\textcircled{7}}$ 2

472 is four hundred and seventy-two. The 7 is in the tens place. The value of the 7 is 7 tens, so it is 70.	It helps to say the number out loud. You say the value of each digit as you read it.
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There are often many different ways to solve a problem.



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

7 Explain what happens to a single-digit number and a 2-digit number when it is multiplied by 10.

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

Tomas made nine 3-digit numbers using a set of place value cards. Seven of the numbers are 473, 689, 358, 134, 925, 247 and 791. What could the other two numbers be? Compare your numbers with those of someone else in your class. If your numbers are different, can you explain why?

Questions to help you think about how you learn.

Arun says multiples of 10 are special numbers. Why do you think Arun says that?

What you have learned in the unit.

Look what I can do!

- I can read and record time using analogue clocks.
- I can read and record time using digital clocks.
- I can link analogue and digital times.

Questions that cover what you have learned in the unit.

Check your progress

1 Complete these pieces, which are from a 1 to 1000 number grid.

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 4



Projects and their accompanying teacher guidance have been written by the NRICH Team. NRICH is an innovative collaboration between the Faculties of Mathematics and Education at the University of Cambridge, which focuses on problem solving and on creating opportunities for students to learn mathematics through exploration and discussion. rich.maths.org.

Dicey fractions

Sofia and Arun are playing a fraction game. They draw a grid like this and write a denominator of 10 in each box:

10	10	10
10	10	10
10	10	10

Thinking and Working Mathematically

There are some important skills that you will develop as you learn mathematics.

Specialising
is when I choose an example and check to see if it satisfies or does not satisfy specific mathematical criteria.

Characterising
is when I identify and describe the mathematical properties of an object.

Generalising
is when I recognise an underlying pattern by identifying many examples that satisfy the same mathematical criteria.

Classifying
is when I organise objects into groups according to their mathematical properties.



Critiquing
is when I compare and evaluate mathematical ideas, representations or solutions to identify advantages and disadvantages.

Improving
is when I refine mathematical ideas or representations to develop a more effective approach or solution.

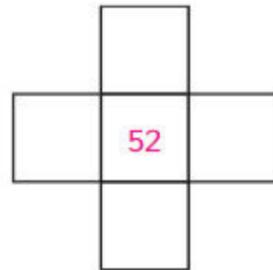
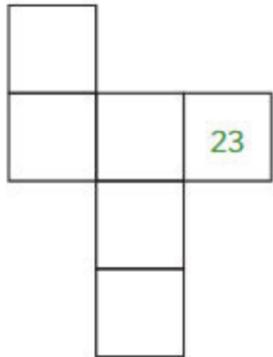
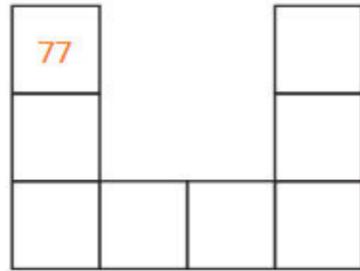
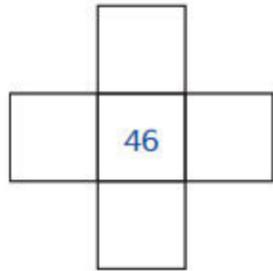
Conjecturing is when I form mathematical questions or ideas.

Convincing
is when I present evidence to justify or challenge a mathematical idea or solution.

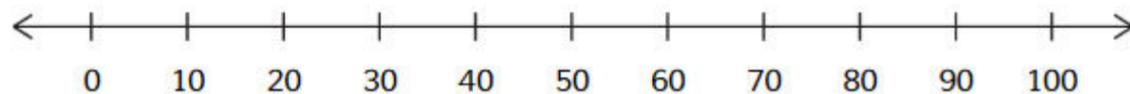


Getting started

1 Complete the 100 square pieces.



2 Mark 42 and 87 on the number line.



3 Round each number to the nearest 10.

72 29 45 60

1.1 Hundreds, tens and ones

We all use numbers every day. In this unit you will explore numbers to 1000. There are 365 days in a year, you might live at number 321 or read a book with 180 pages in it.

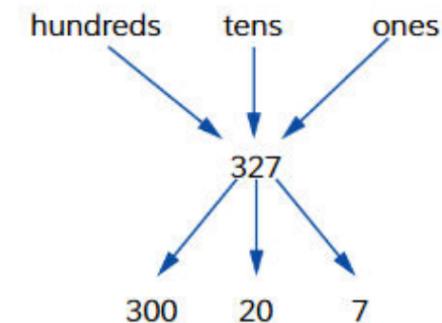


> 1.1 Hundreds, tens and ones

We are going to ...

- say, read and write numbers and number words from 0 to 1000
- know the value of each digit in a 3-digit number
- count on and count back in steps of 1 and 10 from any number.

3-digit numbers are made up of hundreds, tens and ones.



thousand

You need to know what each digit represents to understand the value of the whole number.

Exercise 1.1

1 Complete these pieces, which are from a 1 to 1000 number strip.

The pieces are:

- A 3x4 grid with '132' in the top-left cell.
- A 4x3 grid with '479' in the middle-right cell.
- A cross-shaped strip with '256' in the center cell.
- An L-shaped strip with '147' in the top-right cell.
- A cross-shaped strip with '782' in the center cell.

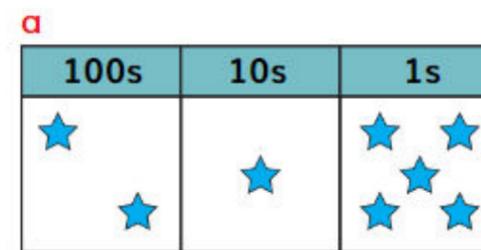
2 Complete the missing numbers.

$$428 = \square 00 + \square 0 + \square$$

$$913 = \square 00 + \square 0 + \square$$

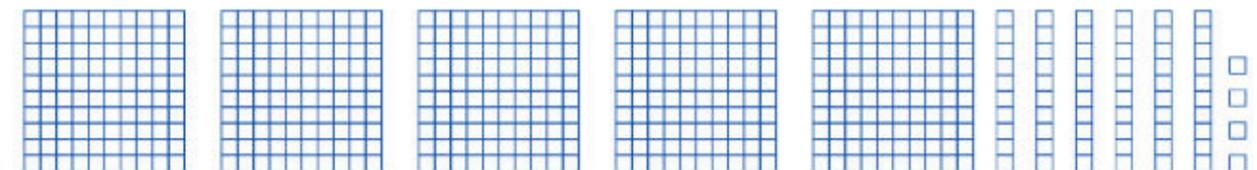
<input type="text"/>	<input type="text"/>	<input type="text"/>	=	500	+	70	+	6
<input type="text"/>	<input type="text"/>	<input type="text"/>	=	300	+	90	+	5

3 What 3-digit number is shown in each place value grid?





4 What 3-digit number is represented below?



Worked example 1

What is the value of the ringed digit in this 3-digit number?

4⑦2

472 is four hundred and seventy-two.

The 7 is in the tens place.

The value of the 7 is 7 tens, so it is 70.

It helps to say the number out loud.

You say the value of each digit as you read it.

5 What is the value of the ringed digit in each 3-digit number?

6③7 _____

10⑨ _____

⑨21 _____

3⑨4 _____

76⑧ _____

②53 _____

Which tens values have not been used in these numbers?

Is it easier to find the value of the hundreds, tens or ones digit?
Why do you think that is?

Think like a mathematician

Tomas makes nine 3-digit numbers using a set of place value cards. Seven of the numbers are 473, 689, 358, 134, 925, 247 and 791. What could the other two numbers be?

Compare your numbers with those of someone else in your class.

If your numbers are different, can you explain why?

6 Use these number words to write four 3-digit numbers in words.

hundred	eight	and	seventy-	fifty-	three
---------	-------	-----	----------	--------	-------

1 _____

2 _____

3 _____

4 _____

Look what I can do!

- I can say, read and write numbers and number words from 0 to 1000.
- I know the value of each digit in a 3-digit number.
- I can count on and count back in steps of 1 and 10 from any number.



> 1.2 Comparing and ordering

We are going to ...

- compare numbers by looking at the value of each digit in turn
- use the inequality symbols is less than, $<$, and is greater than, $>$, when comparing two numbers
- order numbers from smallest to greatest and from greatest to smallest.

When you know the value of each digit in a 3-digit number, you can compare numbers and use what you find out to put them in order. You can also estimate where a number belongs on the number line.

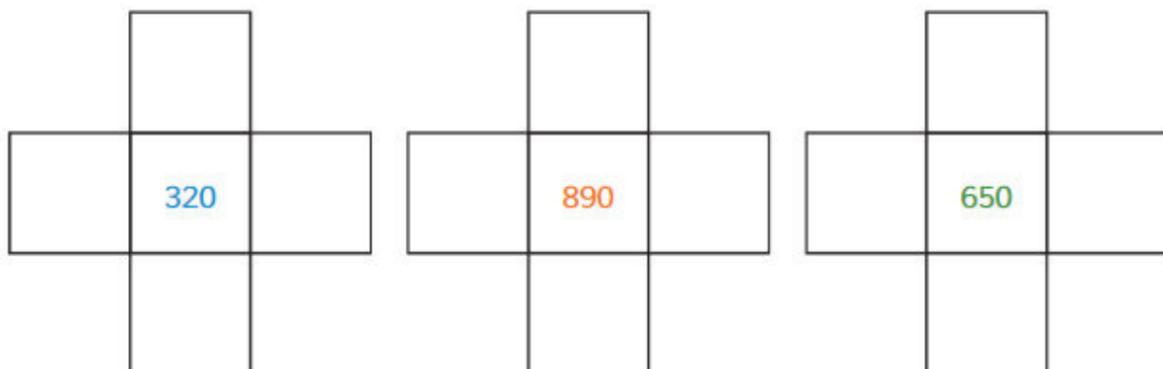
digit inequality
inequalities
is greater than, $>$
is less than, $<$
symbol

375 is less than
475. 375 comes
before 475 on the
number line.



Exercise 1.2

1 Complete these pieces from a 1000 square.



2 Compare these numbers and complete the sentences.

a

100s	10s	1s
4	5	8
6	4	3

_____ is greater than _____

and _____ is less than _____.

b

100s	10s	1s
4	7	5
4	7	2

_____ is greater than _____

and _____ is less than _____.

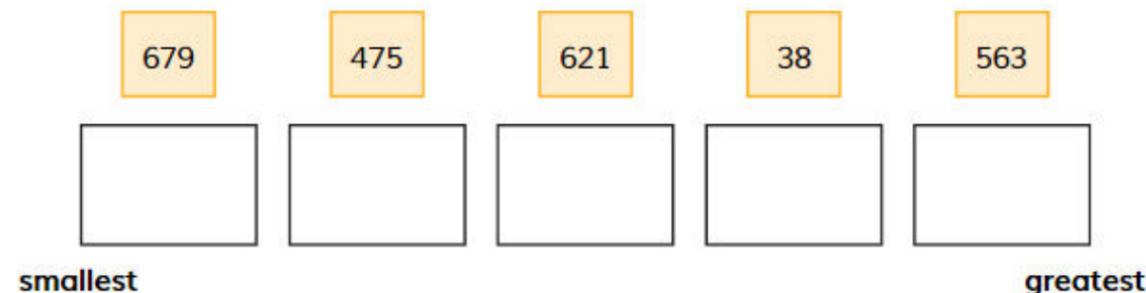
c

100s	10s	1s
8	3	8
8	8	3

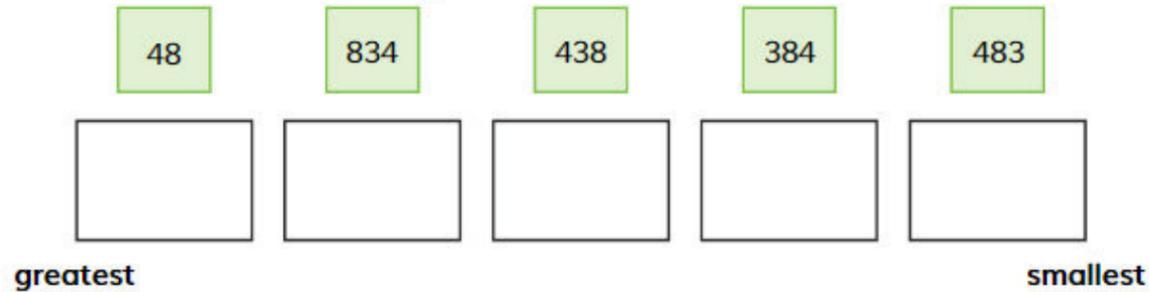
_____ is greater than _____

and _____ is less than _____.

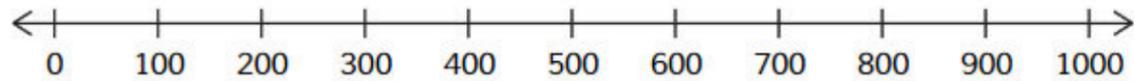
3 Order these numbers from smallest to greatest.



4 Order these numbers from greatest to smallest.



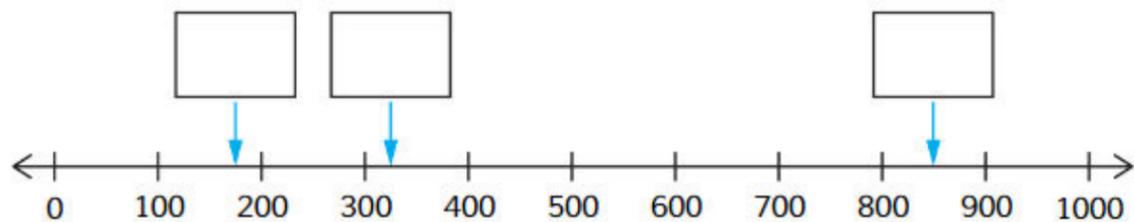
5 Mark the numbers in question 4 on the number line.



6 Estimate the value of each number marked on the number line.

Tip

Remember that 'estimate' means a sensible guess.



7 Complete these inequalities.

	< 263	671 <	
	> 457	346 >	

Think like a mathematician

Use these numbers and symbols to make three correct statements.
234, 243, 243, 278, 278, 287, <, =, >.
Find a different way to do it.

First, it is easier to use the equals sign and two numbers that are the same.

Compare your answers with those of someone else in your class. How are they the same? How are they different? Work together to find all the possible solutions.

Do you agree with Sofia? Why?



Look what I can do!

- I can compare numbers by looking at the value of each digit in turn.
- I can use the inequality symbols is less than, <, and is greater than, >, when comparing two numbers.
- I can order numbers from smallest to greatest and from greatest to smallest.

