

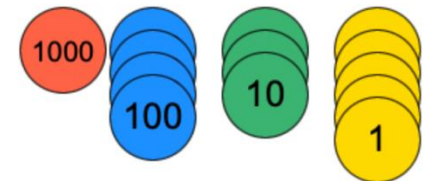
*“They didn’t do it like that when I was at school.”*

Find out more about the mastery approach to maths and how to support your child’s learning

Workshop 1: Number, addition and subtraction  
7 – 8pm Thursday 1<sup>st</sup> February 2024  
Year 6 Classroom

	$6 + 4 = 10$ $4 + 6 = 10$ $10 - 4 = 6$ $10 - 6 = 4$
	$6 + 4 = 10$ $4 + 6 = 10$ $10 - 4 = 6$ $10 - 6 = 4$

Tens Frame      Part Whole Model



# Welcome

- Introduction to Maths Mastery and maths at Cookham Rise
- Supporting your child at home
- Formal methods for addition and subtraction
- Resources – time to play!
- Questions

# Maths at Cookham Rise

- Complete Maths



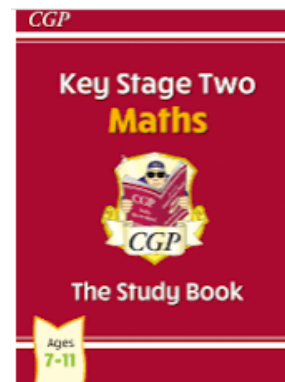
- NCTEM



- White Rose Maths



- CGP workbooks



- Times Table Rock Stars



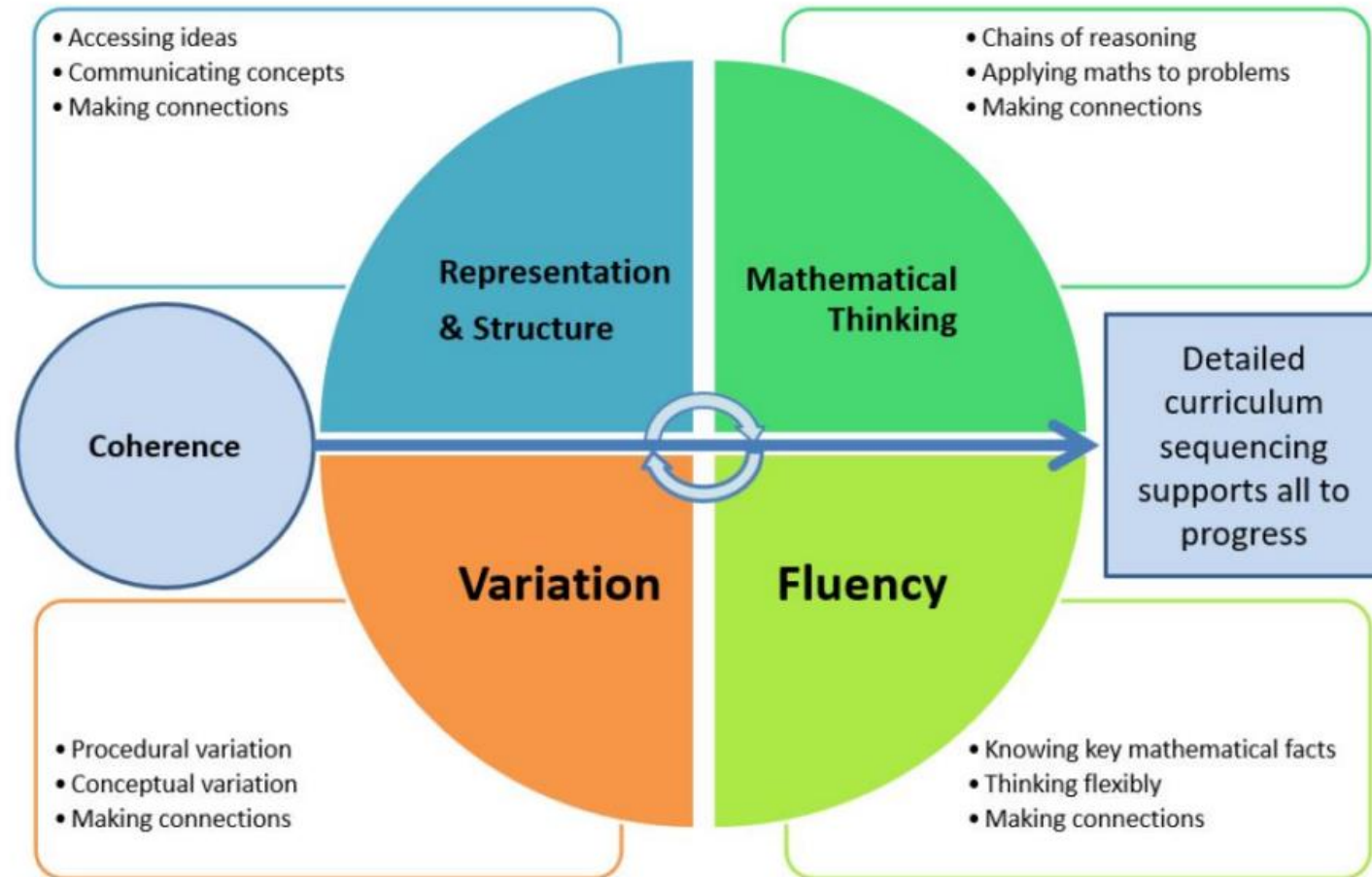
# What is Maths Mastery?

***The Maths Mastery approach originated in Asia, in high performing schools in cities including Shanghai and Singapore. In the UK, hundreds of schools have adopted this approach, and organisations including Ofsted, the DfE, and the NCETM are supporting Maths Mastery.***

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.
- Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.
- In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.
- Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.
- Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.

# 5 big ideas

## Teaching for Mastery



# MASTERY MATHS

CAN YOU  
MAKE IT?



CAN YOU  
DRAW IT?



CAN YOU  
EXPLAIN IT?



HOW COULD  
YOU DO IT  
DIFFERENTLY?



WHY DID YOU  
CHOOSE THAT  
METHOD?



CAN YOU MAKE  
IT EASIER?



CAN YOU MAKE  
IT HARDER?



HOW MANY  
DIFFERENT  
WAYS COULD  
YOU SOLVE IT?



HOW DO YOU  
KNOW IF IT'S  
RIGHT?



CAN YOU SPOT  
AN ERROR?



HOW  
EFFICIENT IS  
THE METHOD  
USED?



CAN YOU  
CREATE YOUR  
OWN PROBLEM  
USING THE  
SAME STYLE?



CAN YOU  
TEACH  
SOMEONE  
ELSE?



CAN YOU WRITE  
INSTRUCTIONS  
FOR SOMEONE  
TO FOLLOW?



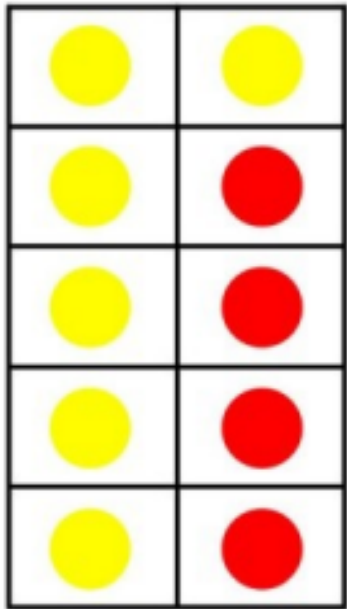
WHAT NEW  
MATHS  
LANGUAGE HAVE  
YOU LEARNT?  
CAN YOU  
EXPLAIN IT?



EXPLAIN WHAT  
WAS DIFFICULT  
ABOUT THE  
PROBLEM?  
HOW DID YOU  
OVERCOME IT?

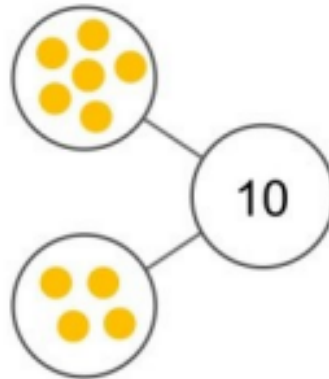


# Representation and structure



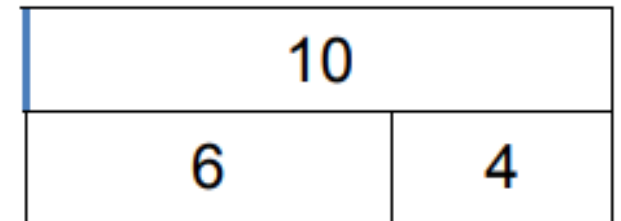
$$\begin{aligned}6 + 4 &= 10 \\4 + 6 &= 10 \\10 - 4 &= 6 \\10 - 6 &= 4\end{aligned}$$

Tens Frame



$$\begin{aligned}6 + 4 &= 10 \\4 + 6 &= 10 \\10 - 4 &= 6 \\10 - 6 &= 4\end{aligned}$$

Part Whole Model



$$\begin{aligned}6 + 4 &= 10 \\4 + 6 &= 10 \\10 - 4 &= 6 \\10 - 6 &= 4\end{aligned}$$

Bar Model

# Representation and structure



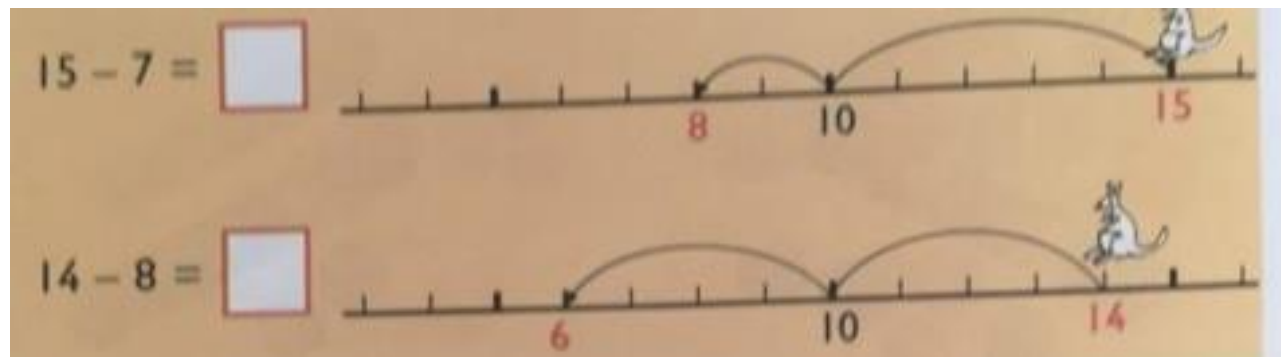
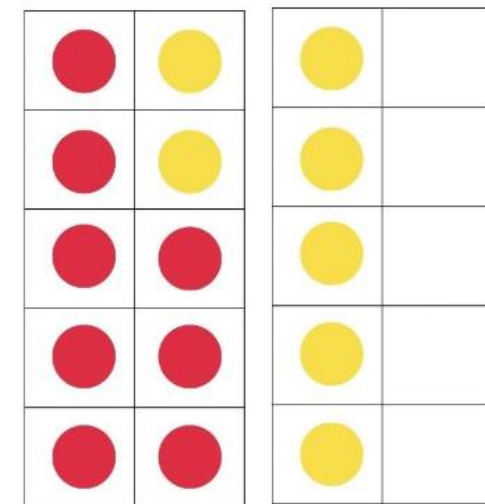
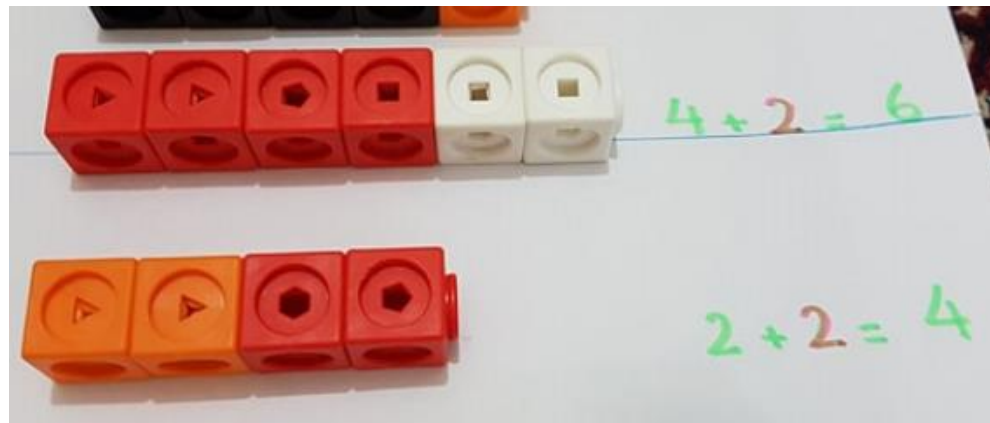
$$2 + 8$$



$$3 + 7$$



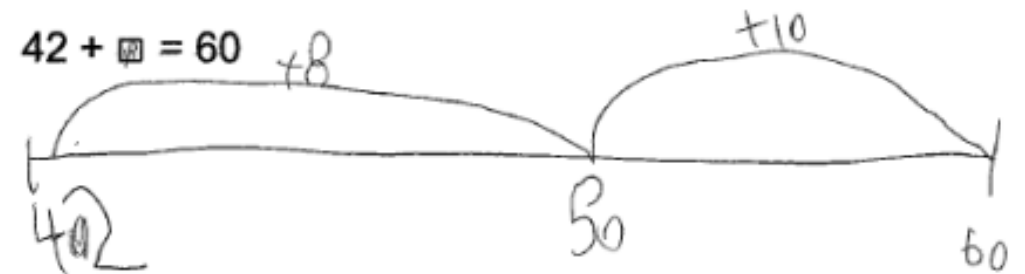
$$4 + 6$$



# By the end of KS1

- Add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus.
- Recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If  $7 + 3 = 10$ , then  $17 + 3 = 20$ ; if  $7 - 3 = 4$ , then  $17 - 3 = 14$ )

"42 add 8 would equal 50, then add the 10 would equal 60, so it is 18."



$$\begin{aligned}4 + 6 &= 10 \\6 + 4 &= 10 \\10 - 4 &= 6 \\10 - 6 &= 4 \\4 + 16 &= 20 \\6 + 14 &= 20 \\20 - 6 &= 14 \\20 - 4 &= 16\end{aligned}$$

$$\begin{aligned}72 - 38 &= 34 \\72 - 30 &= 42 \\42 - 8 &= 34\end{aligned}$$

"I know 72 take away 30 is 42. 42 take away 8 equals 34."

# Supporting children

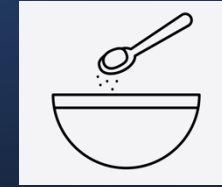
- [https://www.youtube.com/watch?v=8FRAa2\\_O-ko](https://www.youtube.com/watch?v=8FRAa2_O-ko)

# It wasn't like this when I was at school!

- Ask your child to explain the method
- Explain there's often more than one way
- Look for information in the class letter; ask the teacher for more information
- Talk positively about maths and how you use it in real life
- Avoid saying "I was never any good at maths"
- Watch the videos on the "White Rose maths" website

The image shows a screenshot of the White Rose Education website. At the top, there's a navigation bar with 'White Rose EDUCATION' and links for 'Schools & teachers', 'Parents & pupils', 'Shop', 'About', and 'Help'. Below this is a search bar and a filter menu. The main content area displays a curriculum overview for 'Maths Year 6 (63 schemes)'. The overview is organized by term: 'Autumn term' and 'Spring term'. A large blue arrow points from the 'Addition, subtraction, multiplication and division' box in the Autumn term to a detailed view of that topic. Below the arrow, there's a warning message: 'These videos are intended to be used alongside the White Rose Education premium resources which must have been provided by your teacher.' At the bottom, there are two video thumbnails. The first is titled 'ADD AND SUBTRACT INTEGERS' and the second is titled 'COMMON FACTORS'. Both thumbnails feature the White Rose Maths logo and a play button icon.

# Get involved in maths talk



## Cooking

- Measure ingredients and set the timer together
- Talk about doubling and halving quantities
- Talk about fractions in cooking
- Talk about proportions when making squash
- Divide pizzas and cakes into fractions

## Maths in the media

- Look at TV timetables and calculate time differences
- Find percentages in special offers on adverts
- Think about probability in weather forecasts
- How about sport? Calculate goal difference, points to avoid relegation and maybe even play darts!

**Encourage your child to tell the time!**

## Out and about

- Ask your child to give you directions
- Look for patterns and symmetry in buildings
- How many people live in your town?
- Calculate distances and convert between miles and kilometres

## Decorating and Gardening

- Work out areas for painting, carpets and digging
- Discuss perimeter for fencing

## Shopping

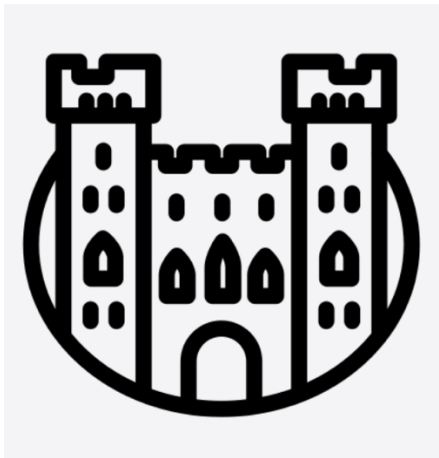
- Work out the budget and change from your shopping
- Involve children in planning your holiday

By the end of Year 6 – from a thousandth to 10 million

Remember - the decimal point never moves!

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
							●		

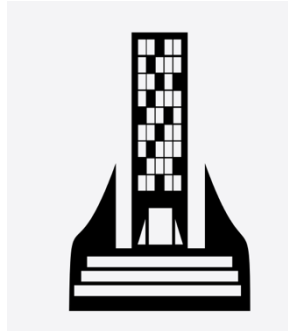
# What 10 times more and less actually means



Distance  
from  
Cookham  
to Windsor  
15,000m



Mountain  
1500m



Skyscraper  
150m



Whale  
15m



Year 6 child  
1.5m



Rat  
0.15m

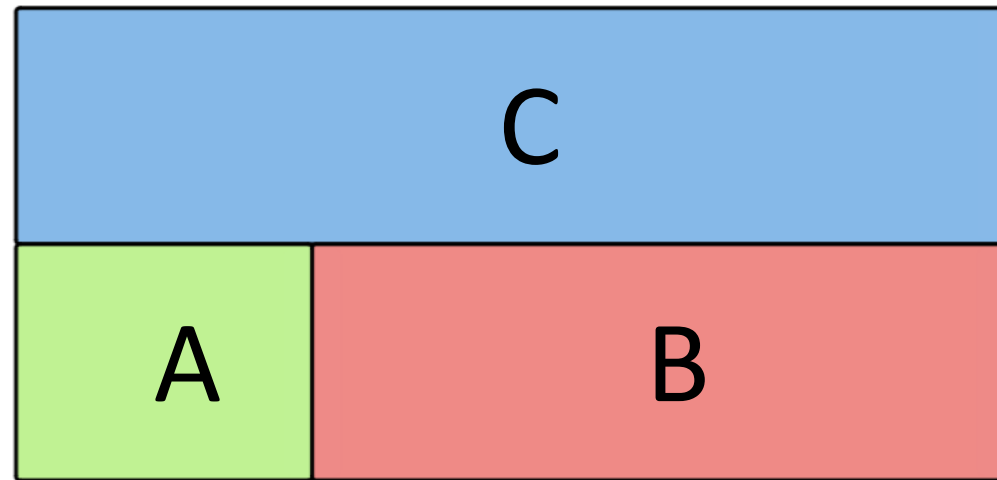


Bee  
0.015m



Wool  
0.0015m

# Recognising the relationship between addition and subtraction



$$A + B = C$$

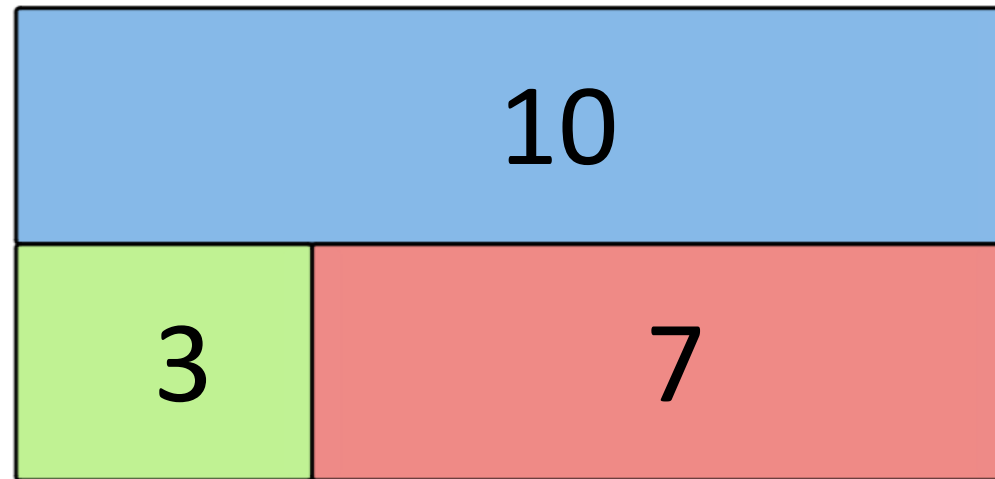
$$B + A = C$$

$$C - A = B$$

$$C - B = A$$

# Recognising the relationship between addition and subtraction

Using the inverse operation



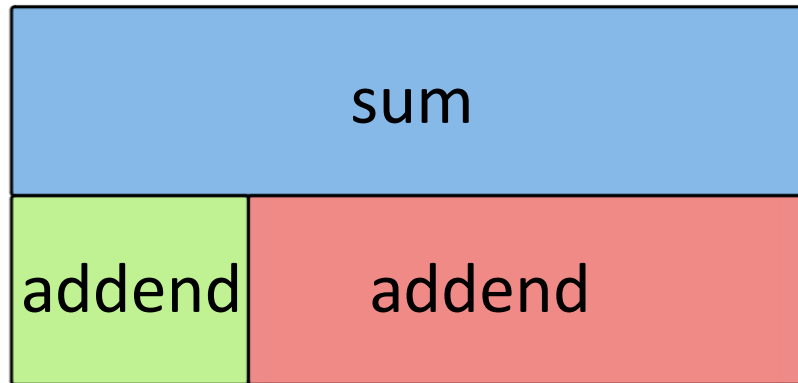
$$3 + 7 = 10$$

$$7 + 3 = 10$$

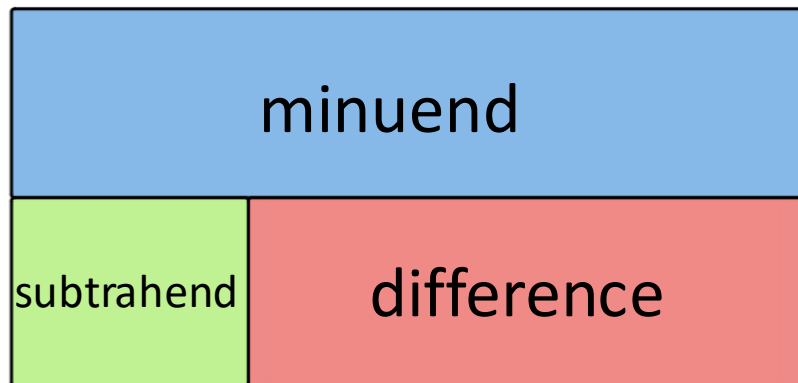
$$10 - 3 = 7$$

$$10 - 7 = 3$$

# Mathematical language



$$\text{addend} + \text{addend} = \text{sum}$$



$$\text{minuend} - \text{subtrahend} = \text{difference}$$

Formal methods of addition

The background features a chalkboard filled with various mathematical notations and diagrams. At the top, there are summation formulas like  $\sum_{k=0}^n x^k$  and  $\sum_{k=0}^n x^k = \frac{x^{n+1}-1}{x-1}$ . Below that, a function  $D(x) = -2 + 3 + 4 \cdot 31447$  is written. A diagram shows a grid with shaded cells and an arrow pointing right, with the value  $V=22$  written below it. There are several equations involving variables  $x$  and  $y$ , such as  $xy = 2$  and  $cx - cy = 25^2$ . A graph of a curve is visible on the right side. At the bottom, there is a table of binary numbers:  $\begin{matrix} 010112 \\ 010002 \\ 200010 \\ 011002 \end{matrix}$  and a diagram of a bell-shaped curve with the label  $\gamma=4$ . Other scattered notes include  $x^2 + 34x + c$  and  $\sum_{x=2}^{n=14!} N^{30} \cdot x$ .

# Addition

*total*

*altogether*

*addition*

*sum*

*more than*

*plus*

*increase*

# Mental methods

*Near doubles and halves*

*Times table knowledge*

*Number Bonds*

*Rounding*

*No exchange*

# Addition

$$4837 + 3406 =$$

$$\begin{array}{r} 4837 \\ + 3406 \\ \hline \hline \end{array}$$

Formal methods of subtraction

The background image shows a collection of handwritten mathematical notes on a dark surface. The notes include:

- At the top, a summation formula:  $\sum_{h=0}^n x^{9478} = \dots$
- A diagram of a rectangle with a shaded section and an arrow pointing to the right, with the value  $= 5.43094$  written next to it.
- A formula:  $D(x) = 2 + 3 + 4.31447$
- A formula:  $\sqrt{a^2 + b^2} = x^2 \cdot nx$
- A system of equations:  $\begin{cases} xy = 2 \\ cx - cy = 2b^2 \\ 2\pi = c \end{cases}$
- A formula:  $x^2 + y^2 = ab + 4c$
- A diagram of a circle with a shaded sector.
- A formula:  $24 + \frac{x}{y} + \frac{a^2 + b^2}{c} + \frac{1}{x^2}$
- A formula:  $men = 384 + n^{20}$
- A formula:  $(x^2 + 34x + c)$
- A formula:  $x = 9.20$
- A summation formula:  $\sum_{x=2}^{n=14!} N^{30} \cdot x - \frac{1}{2} [984 + x^2 + p]$
- A diagram of a triangle with a vertical line through it, labeled with  $\gamma = 4$ .
- A formula:  $\beta = 9 + x^2 + \gamma^2$
- A table of binary numbers: 

010112
211010
010002
200010
011002

# Subtraction – not just taking away

*difference*      *minus*

*less than*      *fewer*      *how many left?*

*decrease*      *reduce*

# Subtraction

$$8703 - 3958 =$$

$$\begin{array}{r} 8703 \\ - 3958 \\ \hline \\ \hline \end{array}$$

Sometimes, other methods are better

$$1.43 - 0.78 =$$

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# Sample questions

18

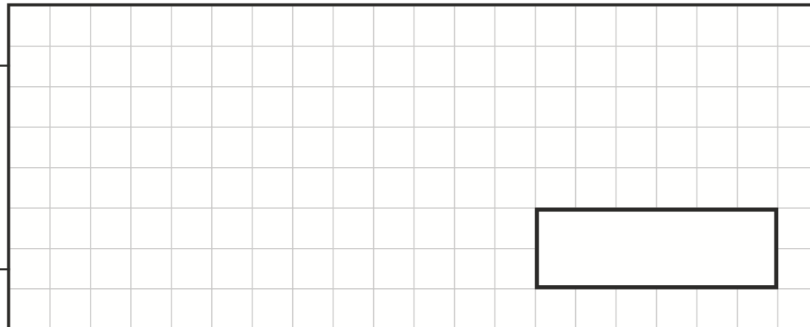
This sign shows the number of **empty spaces** on each level of a car park at 10 am.

<b>P</b>	Empty Spaces
<b>Level 2</b>	511
<b>Level 1</b>	268

In this car park, **each** level has 800 spaces.

What is the total number of cars **parked** in the car park at 10 am?

Show  
your  
method



2 marks

# Sample questions

11

At the start of April, a shop had **15,000** games.

The shop sold:

- **7,918** games in April
- **4,624** games in May.

How many games did the shop have left at the end of May?

Show  
your  
method

A large grid for showing the method. A small box labeled "games" is provided for the final answer.

          
2 marks



Any questions?

Handwritten mathematical notes on a dark background, including:

- $\sum_{k=0}^n x^k = \frac{x^{n+1}-1}{x-1}$
- $D(x) = -2 + 3 + 4 \cdot 31447$
- $\sqrt{a^2 + b^2} = x^2 \cdot \frac{22}{4x}$
- $x^2 + y^2 = ab + 4c$
- $A \cap B$ ,  $A \cup B$
- $C(x, y) = \begin{cases} xy = 2 \\ cx - cy = 2b^2 \\ 2\pi = C \end{cases}$
- $\frac{24+x}{y} + \frac{a^2+b^2}{c} + \frac{1}{x}$
- $men = 384 + n^{20}$
- $x = 9.20$
- $\sum_{x=2}^{n=14!} N_{30} \cdot x - \frac{1}{2} [984 + x^2 + p]$
- $x \leq 549$
- Binary code:  $\begin{bmatrix} 010112 \\ 211010 \\ 010002 \\ 200010 \\ 011002 \end{bmatrix}$
- Graphs of functions and geometric diagrams.