Homework book

Autumn

Year 4

This guide is for parents/carers and any adult working with the child.

The Year 4 homework book is aimed at parents and carers, to enable you to engage in maths with your child in a fun and practical way. There are ten activities, each linked to the units of work in the Year 4 programme of study.

In order to support your child with the tasks, each piece of homework is accompanied by parental guidance. This guidance aims to provide an opportunity for you to understand the methods your child is being taught, which may differ from methods you are familiar with.

What is 'Mastery'?

The 'mastery approach' to teaching mathematics is the underlying principle of Mathematics Mastery. Instead of learning mathematical procedures by rote, we want your child to build a deep understanding of concepts which will enable them to apply their learning in different situations. We do this by using three key principles:

Conceptual understanding

Your child will use multiple concrete and pictorial representations and make connections between them. A key part of a 'deep understanding' in maths is being able to represent ideas in lots of different ways.
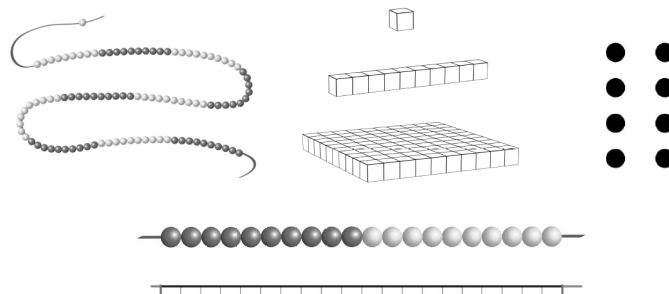
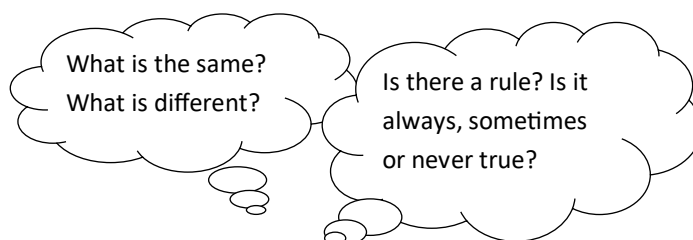34 864 - 25 423 = 9441

This is an *equation*

We don't round a number 'up' or 'down', we round it to the *nearest multiple* of 10, 100, 1000 etc.

Mathematical language

When asked to explain, justify and prove their ideas, your child is deepening their understanding of a concept. The correct mathematical vocabulary is taught from the outset and communication and discussions are encouraged.

Mathematical thinking

Lots of opportunities are planned for your child to investigate open questions that require them to sort and compare, seek patterns and look for rules. Good questioning, both for and from your child, build a deeper understanding of maths.

What is the same? What is different?

Is there a rule? Is it always, sometimes or never true?

Parental guidance

Unit 1: Reasoning with 4-digit numbers (week 1 of 2) ← Unit number and unit title

Parental Guidance

Pupils extend their understanding of the number system and place value to include 4-digit numbers. This week explores recognising the place value, ordering and comparing 4-digit numbers. ← Key learning

In Year 3 pupils consolidated and deepened their understanding of 3- digit numbers through reasoning and problem solving.

In Year 5 pupils will further extend the number system to include 5-digit and 6-digit numbers. ← Prior and future learning: where this objective fits into the sequence of learning over time.

Understanding place value

Thousands	Hundreds	Tens	Ones
(1000) (1000) (1000)	(100) (100)		(1) (1) (1)

This number is 3203

This number is three thousand, two hundred and three·

Children are expected to write numbers in **digits** and **words** with the correct spelling.

There are two hundreds in this number

There is a place holder in the tens place

There are 3 ones

The position of the digit in a number determines its **value.** Where the value is zero (as in the tens place in this number), it does not mean there are none of that value (i.e. 'no' tens). The ten have been regrouped into hundreds, in this example creating 2 hundreds.

← A worked example followed by key points to support your child.

On every parental guidance page the unit title is located at the top, followed by an overview of the key learning. In addition, you will see at the beginning of each unit where the key learning fits in with what your child has previously learnt, along with where the learning will be taken in subsequent years of study. It is important to understand that the principle of mastery does not encourage acceleration, and remember, **depth** of understanding is key to your child becoming a confident mathematician who can think flexibly.

Parent's and pupil's comments

Pupil's comments

Parent's comments

Every activity has a space for parents and pupils to write some comments after it has been completed. This is an opportunity to comment on the result of the activity, if it was enjoyable and how your child found the maths.

You can find further information about the Mathematics Mastery programme online at **www.mathematicsmastery.org**. If you have any questions regarding this homework book please speak with your child's class teacher.

Parental Guidance

Pupils extend their understanding of the number system and place value to include 4-digit numbers. This week explores recognising the place value, ordering of and comparing 4-digit numbers.

In Year 3 pupils consolidated and deepened their understanding of 3-digit numbers through reasoning and problem solving.

In Year 5 pupils will further extend the number system to include 5-digit and 6-digit numbers.

Understanding place value

Thousands	Hundreds	Tens	Ones
(1000) (1000) (1000)	(100) (100)		(1) (1) (1)

Children are expected to write numbers in **digits** and **words** with the correct spelling.

This number is 3203.

This number is three thousand, two hundred and three.

There are two hundreds in this number.

There is a place holder in the tens place.

There are 3 ones.

The position of the digit in a number determines its **value.** Where the value is zero (as in the tens place in this number), it does not mean there are none of that value (i.e. 'no' tens). The tens have been regrouped into hundreds, in this example creating 2 hundreds.

Place Value Battle– greatest number wins

You will need:

A die, some paper and a pen

Instructions:

Each player draws a place value grid.

Thousands	Hundreds	Tens	Ones

Players take it in turns to roll the die, and decide which place value column to write the number in, aiming to create the greatest number.

The person with the greatest number wins 1 point. The first player with 5 points wins!

For example:

I rolled a 4, 5, 1 and 2. The greatest number I can make is… 5421.

I rolled a 3, 2, 5 and another 2. The greatest number I can make is… 5322.

My number is greater! I win the point!

Pupil's comments

Parent's comments

Unit 1: Reasoning with 4-digit numbers (Week 2 of 2)

Parental Guidance

Pupils extend their understanding of the number system and place value to include 4-digit numbers. This week explores rounding 4-digit numbers to the nearest 10, 100 and 1000.
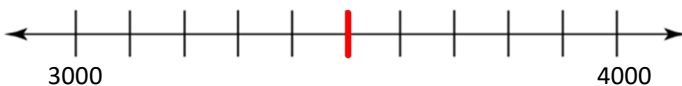
In Year 3 pupils rounded 3-digit numbers to the nearest 10 and 100.

In Year 5 pupils will round 5-digit and 6-digit numbers to the nearest 10, 100, 1000, 10 000 and 100 000.
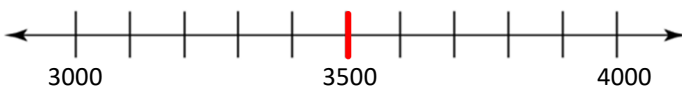
Rounding to the nearest 1000

Rounding 3762 to the nearest 1000

- Find the two nearest multiples of 1000
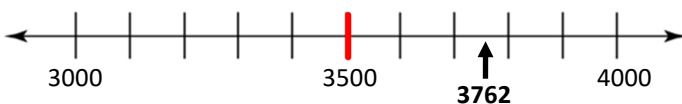

> The closest multiples are 3000 and 4000.

- Write the mid-point between the two multiples of 1000

> The mid point between 3000 and 4000. If the number is 3500 or greater, it will round to 4000. If it is less than 3500 it will round to 3000.

- Estimate the position of the number on the number line

- Decide which is the nearer multiple of 1000

> The closest multiple of 1000 is 4000. 3762 rounded to the nearest multiple of 1000 is 4000.
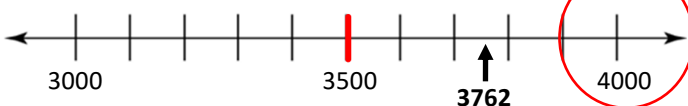
> When rounding, avoid using positional language such as "round up/down". Instead, say "***round to the nearest multiple of…***"

Rounding Race

You will need:

Number cards 0-9, some paper and a pen

Instructions:

Take it in turns to pick four number cards. Arrange the digits to make a 4-digit number. The aim is to be the first player to fill every row with a number.

For example:

Theo picked a 3, 5, 1 and 1

I'm going to arrange them to make 1531. Rounded to the nearest 1000, it rounds to 2000. I can fill in the 2000 row.

Rounded to the nearest 1000, this number rounds to…	Player 1	Player 2
1000		
2000		
3000		
4000		
5000		
6000		
7000		
8000		
9000		

Pupil's comments

Parent's comments

Unit 2: Addition and subtraction (Week 1 of 3)

Parental Guidance

In this unit, pupils will be adding and subtracting using mental methods and using the written column method. When adding or subtracting always encourage your child to look at the calculation before working it out, to consider whether a mental or written method would be more efficient. This week focuses on using mental methods of addition and subtraction.

In Year 3, pupils have used mental strategies and written column methods of addition and subtraction with 3-digit numbers.

In Year 5, pupils will be extended to adding and subtracting 5-digit and 6-digit numbers with mental and written strategies.
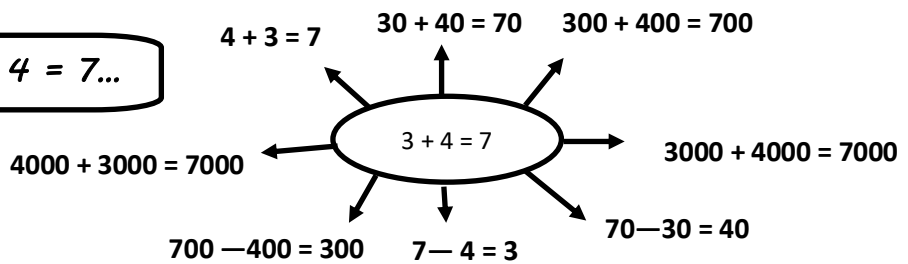
Three key strategies for calculating mentally
Below are three strategies pupils will have used during this week's learning:

Using derived facts

If I know 3 + 4 = 7…

3 + 4 = 7

4 + 3 = 7   30 + 40 = 70   300 + 400 = 700
3000 + 4000 = 7000
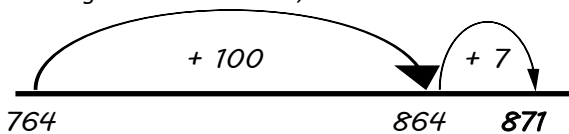70—30 = 40
7— 4 = 3
700 —400 = 300
4000 + 3000 = 7000

Partitioning
Partitioning = A way of breaking a number into at least two parts resulting in a number bond for that number, for example, 12 = 10 + 2.
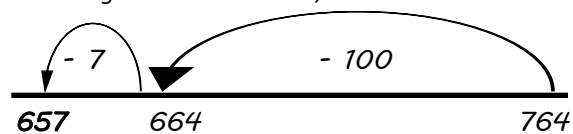
764 + 107 =
Partitioning 107 into hundreds, tens and ones:

+ 100   + 7
764   864   **871**

764 — 107 =
Partitioning 107 into hundreds, tens and ones:

- 7   - 100
657   664   764

Rounding and adjusting
4800—699

I know 699 is only 1 less than 700…

But now I've subtracted one too many! I need to add one back

Step 1:
- 700
4100   4800
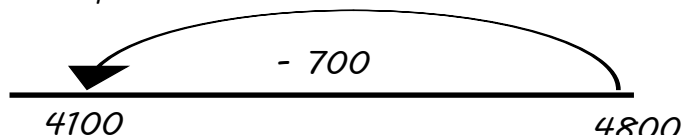
Step 2:
+ 1
4100   4101
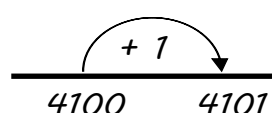
Four in a Row

You will need:

A different colour pencil for each person.

Instructions:

Take it in turns to choose a calculation and work out the answer in your head. After you've worked out the answer correctly, colour in the rectangle. The winner is the first person to shade in four rectangles, either in a row or a column.

8000 − 2000	2000 + 836	736 − 121	4500 + 3500	400 − 198
700 − 689	80 + 90	736 + 140	82 − 57	380 + 50
74 + 17	140 − 60	470 + 47	6000 − 999	6400 + 602
1200 − 500	540 + 66	499 + 500	470 + 123	73 + 82
700 − 598	400 + 499	5000 − 2500	334 − 121	67 + 68

Pupil's comments

Parent's comments

Parental Guidance

In this unit, pupils will be adding and subtracting using mental methods and using the written column method. This week focuses on using the written column method of addition and subtraction.
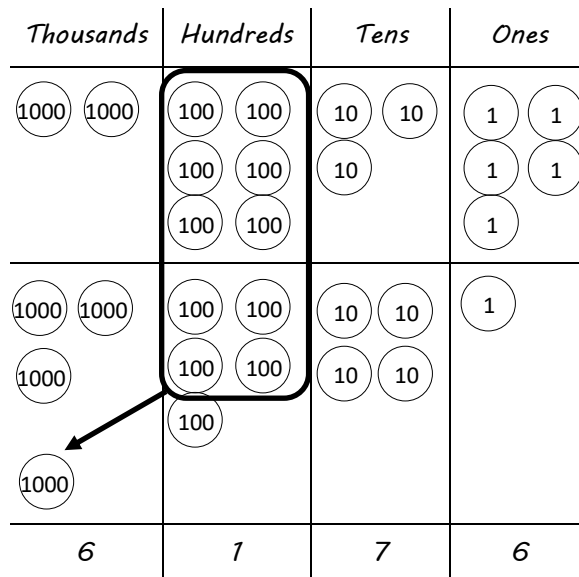
Pupils will have been introduced to column addition and subtraction, using the written method alongside place value counters. These counters support pupils to understand how and why the column methods work. As well as using the counters themselves, pupils will have also drawn representations of them, as shown below.

Column addition

What pupils will write: *What pupils will draw:*   *What pupils will say:*

$$
\begin{array}{r}
2\ 6\ 3\ 5 \\
+\ 3\ 5\ 4\ 1 \\
\hline
6\ 1\ 7\ 6 \\
\end{array}
$$

Thousands	Hundreds	Tens	Ones
1000 1000	100 100 / 100 100 / 100 100	10 10 / 10	1 1 / 1 1 / 1
1000 1000 / 1000	100 100 / 100 100 / 100	10 10 / 10 10	1
1000			
6	1	7	6

5 ones plus 1 one is equal to 6 ones

3 tens plus 4 tens is equal to 7 tens.

6 hundreds plus 5 hundreds is equal to 11 hundreds. **I need to regroup 10 hundreds for 1 thousand**. There is 1 hundred counter left .
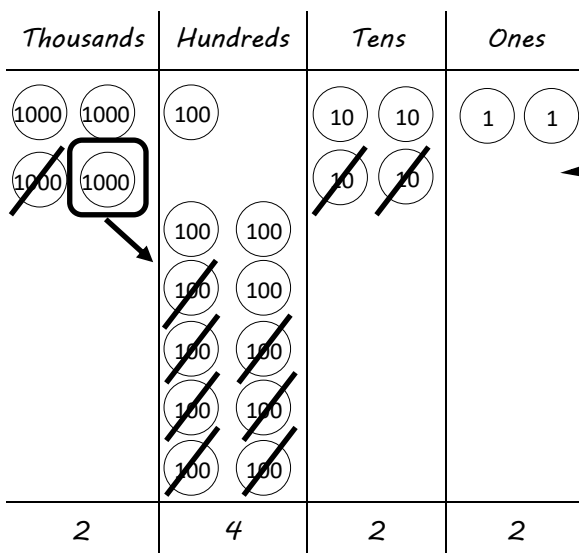
2 thousands plus 3 thousands plus 1 thousand is equal to 6 thousands.

Column subtraction

What pupils will write: *What pupils will draw:*   *What pupils will say:*

$$
\begin{array}{r}
^3\cancel{4}\ ^1\cancel{1}\ 4\ 2 \\
-\ 1\ 7\ 2\ 0 \\
\hline
2\ 4\ 2\ 2 \\
\end{array}
$$

Thousands	Hundreds	Tens	Ones
1000 1000	100	10 10	1 1
1000 1000	100 100 / 100 100 / 100 100 / 100 100 / 100 100	10 10	
2	4	2	2

No ones are subtracted, so there are 2 ones.

4 tens subtract 2 tens is equal to 2 tens

I can't subtract 7 hundred counters from 1 hundred counter. **I regroup 1 thousand for 10 hundreds**. 11 hundreds subtract 7 hundreds is equal to 4 hundreds.

3 thousands subtract 1 thousand is equal to 2 thousands.

Kitchen Calculations

Have a look in your kitchen cupboard. What can you find measured in grams by weight?

Write what the items are and what they weigh. Can you find 5 items?

Can you find **two or more** items which weigh altogether:

Less than 500 g?

More than 1000 g?

Can you find two objects to have a **difference** of **less than** 100 g?

Can you find two objects to have a **difference** of **more than** 100 g?

Which do you need a written method for and which can you do in your head?

For example:

Ruby found a tin of baked beans, a packet of rice, some tomato puree, a jar of raspberry and a block of cheese.

The difference between a tin of baked beans and some tomato puree is 430 — 200. I can calculate this in my head 430 — 200 = 230 g

The total weight of a block of cheese and a jar of jam is 227g + 359g.

$$\begin{array}{r} 2\ 2\ 7 \\ +\ 3\ 5\ 9 \\ \hline 5\ 8\ 6 \end{array}$$

Pupil's comments

Parent's comments

Unit 2: Addition and subtraction (Week 3 of 3)

Parental Guidance

In this unit, pupils will be adding and subtracting using mental methods and using the written column method. This week, pupils have been applying the methods used in weeks 1 and 2 to word problems.

This week's game involves adding and subtracting 4-digit numbers– remember to always encourage your child to look at the numbers first, to consider if they can be easily calculated mentally, or if a written method will be needed.

Suggested methods can be found in the Parental Guidance pages for Unit 2 weeks 1 and 2.

(You may want to use the space below to write any working out)

Make 3000

You will need:

A die, some paper.

Instructions:

Together, roll a die 8 times– write down the 8 digits.

Arrange the digits to make two 4-digit numbers.

Add or subtract the two 4-digit numbers.

How close can you get to 3000?

Who was the closest?

Can you play it again with another target number?

For example:

Anna and her dad took it turns to roll the die, a total of eight times. They rolled a 4, 2, 6, 1, 1, 5, 3, and another 2.

I know 4000—1000 = 3000, so I'm going to start by putting the 4 and the 1 into the thousands columns...

$$4\ 6\ 3\ 2$$
$$-\ 1\ 5\ 2\ 1$$
$$\overline{3\ 1\ 1\ 1}$$

I know 2000 + 1000 is 3000, but if I use a 2 and a 1 in the thousands columns, my answer will definitely be more than 3000... I'm going to put both 1 digits in the thousands columns...

$$1\ 5\ 6\ 2$$
$$+\ 1\ 4\ 3\ 2$$
$$\overline{2\ 9\ 9\ 4}$$

My number is the closest!

Pupil's comments

Parent's comments

Unit 3: Multiplication and division (Week 1 of 3)

Parental Guidance

In this unit, pupils multiply and divide using mental methods and are first introduced to written short methods of multiplication and division. This week, pupils have been using mental methods of multiplication and division.

In Year 3 pupils multiplied and divided using mental methods of calculation.

In Year 5 pupils continue to use both mental and written methods of multiplication and division, extending this to decimal numbers and division with remainders.

Mental strategies for multiplication and division, which pupils have used this week:

Using known facts

30 x 7 = ?

I know 3 x 7 = 21. One of the factors, 30, is ten times bigger than 3. So the product will be ten times bigger too. 30 x 7 = 210.

Using the distributive law

16 x 6 = ?

I know 10 x 6 = 60 and 6 x 6 = 36.
60 + 36 = 96.
16 x 6 = 96.

Using the associative law

2 x 7 x 5 = ?

It doesn't matter what order I multiply the number in, I'll still get the same product.

2 x 5 = 10	10 x 7 = 70
or 2 x 7 = 14	14 x 5 = 70
or 7 x 5 = 35	35 x 2 = 70

Area attack

You will need:

A die or number cards 1-6, two different coloured pencils.

Instructions:

Take it in turns to roll a die, twice. Multiply the two numbers together. Colour in a rectangle on the grid below, of that number of squares. The winner is the person who has the most squares coloured in when the grid is completely filled.

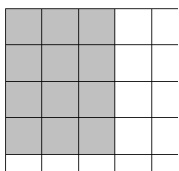For example: Lisa has rolled a 6 and a 2.

> *6 x 2 = 12. I need to colour a rectangle which covers 12 squares.*

> *I could colour 4 rows of 3 squares, 3 rows of 4 squares, 6 rows of 2 squares or 2 rows of 6 squares.*
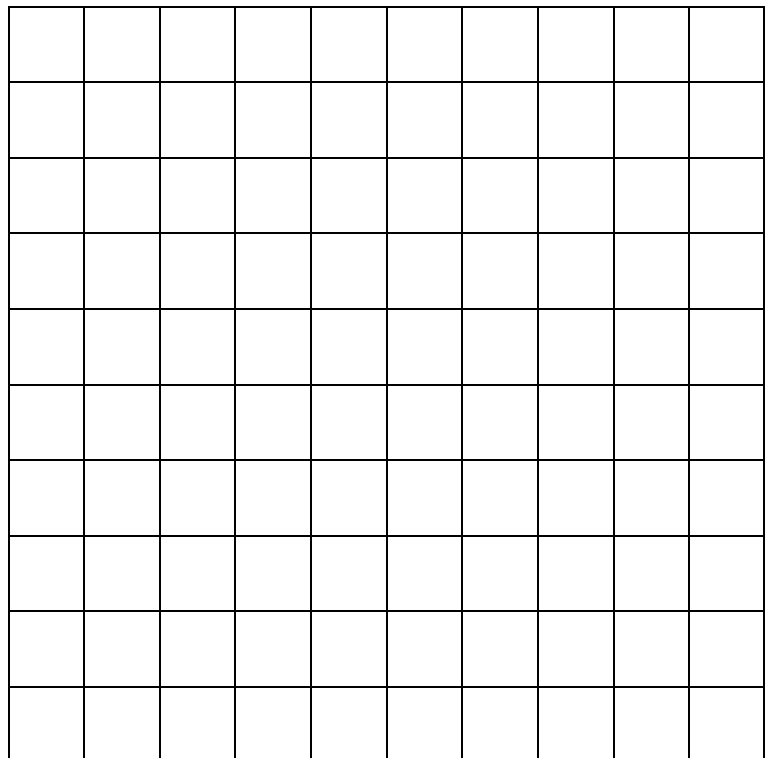
This is what Lisa decided to colour:

Pupil's comments

Parent's comments

Parental Guidance

In this unit, pupils multiply and divide using mental methods and are first introduced to written short methods of multiplication and division. This week, pupils have been using short multiplication to multiply 2-digit and 3-digit numbers by 1-digit numbers.

Short multiplication

What pupils will write: *What pupils will draw:*   *What pupils will say:*

```
  3 4 1
x     4
-------
```

Thousands	Hundreds	Tens	Ones
	100 100	10 10	1
	100	10 10	

341 is three hundreds, 4 tens and 1 one.

```
  3 4 1
x     4
-------
      4
```

Thousands	Hundreds	Tens	Ones
	100 100	10 10	
	100	10 10	
			1 1
			1 1
			4

1 one multiplied by four is equal to four ones.

```
  3 4 1
x     4
-------
  6 4
  1
```

Thousands	Hundreds	Tens	Ones
	100 100		
	100		
	100	10 10	1 1
		10 10	1 1
		10 10	
	1	6	4

4 tens multiplied by four is equal to 16 tens. That's the same as one hundred and six tens. I need to regroup 10 tens for 1 hundred. There are now 6 tens in the tens column.

```
  3 4 1
x     4
-------
1 3 6 4
  1
```

Thousands	Hundreds	Tens	Ones
1000	100	10 10	1 1
	100 100	10 10	1 1
		10 10	
1	3	6	4
	1		

3 hundreds multiplied by 4 is equal to 12 hundreds. I also need to add the regrouped one hundred, so there are 13 hundreds altogether. I need to regroup 10 hundreds for one thousand. There are 3 hundreds lefts in the hundreds column.

Four in a Row

You will need:

A different colour pencil for each person, some scrap paper to write down any working out.

Instructions:

Take it in turns to choose a calculation and work out the answer. For each multiplication, decide whether you'll need to use column multiplication or if you can work it out mentally. After you've worked out the answer correctly, colour in the rectangle. The winner is the first person to shade in four rectangles, either in a row or a column.

364 x 4	*20 x 20*	*599 x 2*	*4 x 709*	*73 x 6*
8 x 500	*84 x 9*	*300 x 7*	*9 x 200*	*8 x 37*
844 x 5	*474 x 6*	*3 x 903*	*40 x 9*	*5 x 700*
6 x 193	*200 x 8*	*7 x 635*	*473 x 10*	*376 x 2*

Pupil's comments

Parent's comments

Parental Guidance

In this unit, pupils multiply and divide using mental methods and are first introduced to written short methods of multiplication and division. This week, using short division, pupils must divide 3- and 4-digit numbers by one digit, with no remainders.
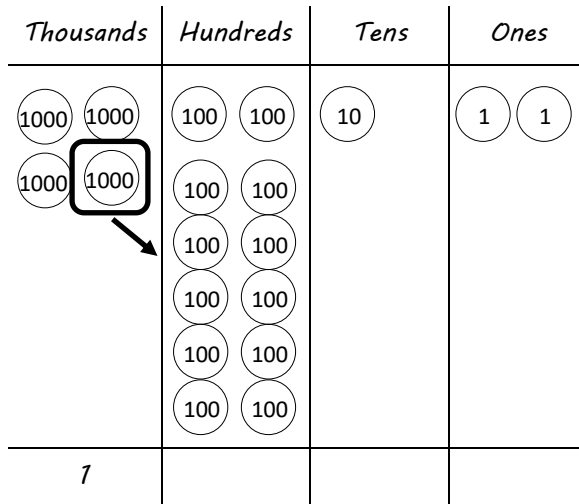
Short division

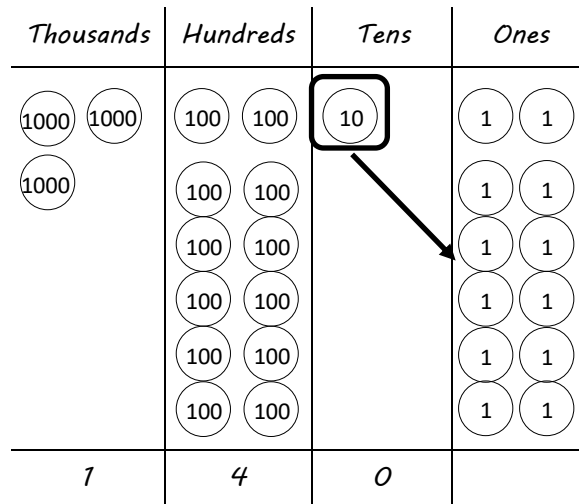*What pupils will write:*   *What pupils will draw:*   *What pupils will say:*

There is one group of three thousands counters.

There is one thousand counter left. I can't group three into this, so I regroup it for 10 hundreds.

There are four groups of 3 hundreds counters.

I can't group one ten counter into any groups of three, so I regroup it for 10 ones.
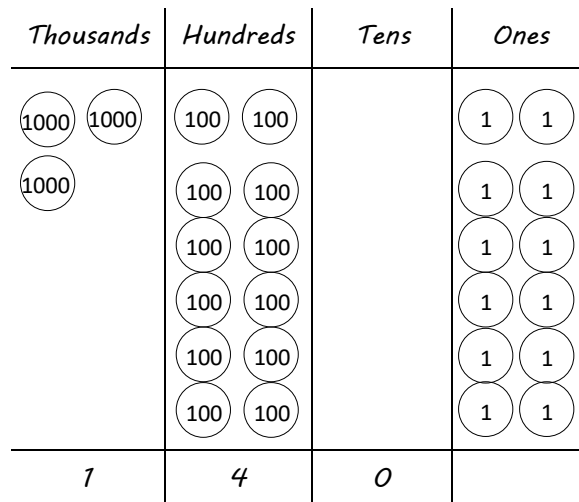
There are four groups of three ones counters.

Countdown

You will need:

The Countdown Cards (see page 31), cut into separate number cards.

A one minute timer (this might be using a clock with a second hand, using a timer on a phone or on a website).

A die or a 1-6 spinner.

Instructions:

Put all of the number cards (25, 50, 75, 100 and numbers 1-10) upside down and choose 6 cards.

Roll a die or use the spinner to generate 3 digits. Write these down in the order they are generated, to make a 3-digit number.

Time yourselves for 1 minute – use the six number cards and the operations +, -, × to see how close you can get to the target number.

For example:

Sarah and Diego picked 25, 100, 2, 4, 7 and 1.

Their target number is 836.

This is what Diego calculated:

7 + 1 = 8

8 × 100 = 800

800 + 25 = 825

2 × 4 = 8

825 + 8 = 833

I was 3 away from the target number!

Pupil's comments

Parent's comments

Parental Guidance

During this unit, pupils will be data handling with pictograms, bar charts and time graphs. This week pupils will have read and interpreted and constructed their own pictograms and bar charts.

In Year 3 pupils learnt to interpret and present data using bar charts, pictograms, tallies and tables.

In Year 5 pupils will interpret information in tables and line graphs and solve comparison, sum and difference problems.

Favourite New York attraction

Pictograms
A way of representing data which uses pictures, arranged either in a row or a column, to show the opinions of people.
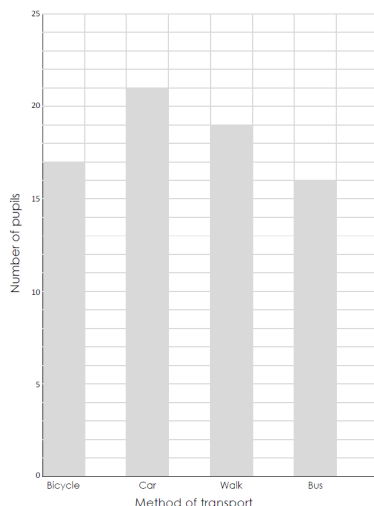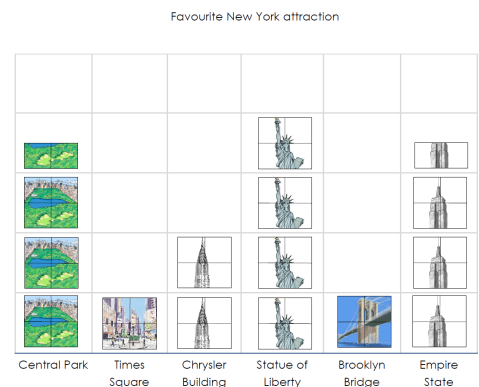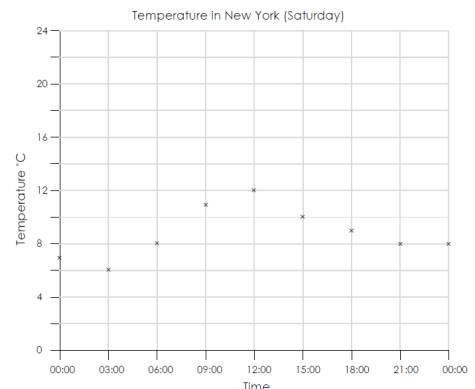

Bar Charts
Data is represented by the length or height of bars.

Time graphs
Time graphs show information that is connected in some way to time and often shows how something changes over time in relation to something else. You can think of time graphs as telling a story, over time.

Both tasks for Week 1 and 2 of this unit are based on constructing bar charts.

Drop the Ruler

*You will need:*

A 30 cm ruler.

Instructions:

Position a ruler between the person's finger and thumb at the '0 cm' mark so that the rest of ruler is above your finger and thumb. Get ready, drop the ruler!

How quickly could they catch the ruler? You can measure by looking at where they caught it – how many centimetres does it read, where the finger and thumb are now holding the ruler?

Write down the result in the table below – you might want to let them try 3 times and record their best score.

Person 1	Person 2	Person 3	Person 4
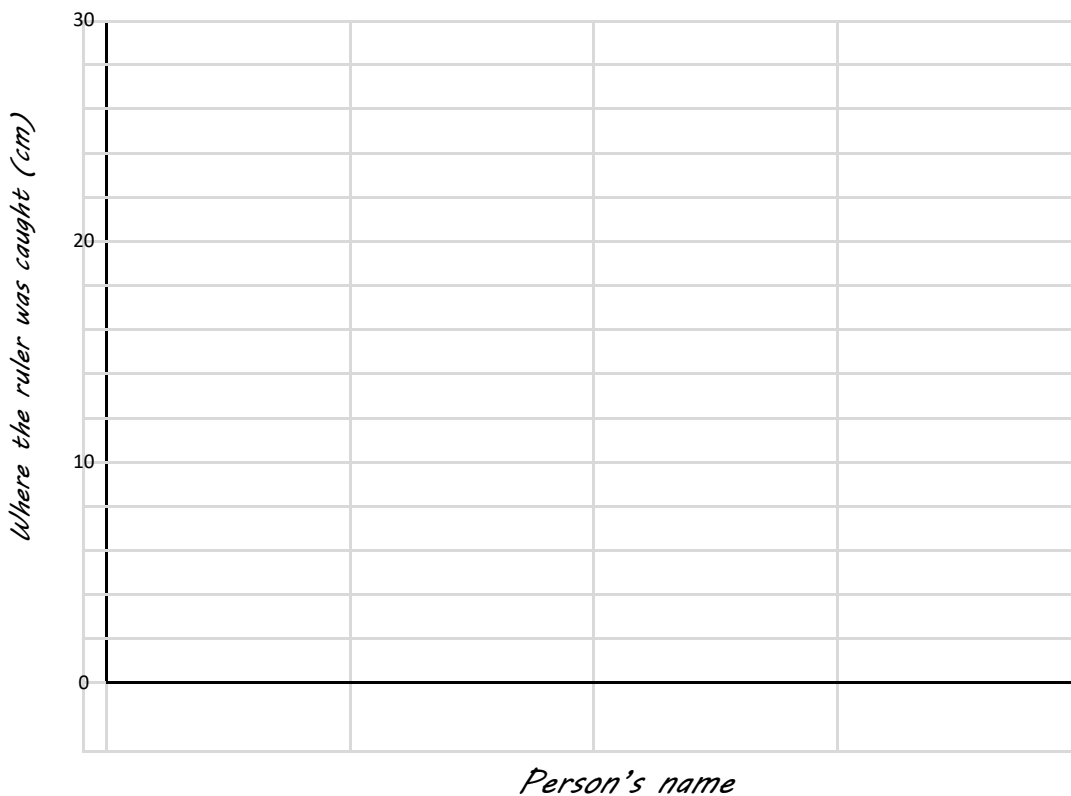
Who was the quickest to catch the ruler?

Why do you think this is?

Pupil's comments

Parent's comments

Unit 4: Discrete and continuous data (Week 2 of 2)

Parental Guidance

During this unit, pupils will be data handling with pictograms, bar charts and time graphs. This week pupils have read, interpreted and constructed their own time graphs.

Methods of data presenting explored during this unit can be found in the Parental Guidance pages for Unit 4 week 1.
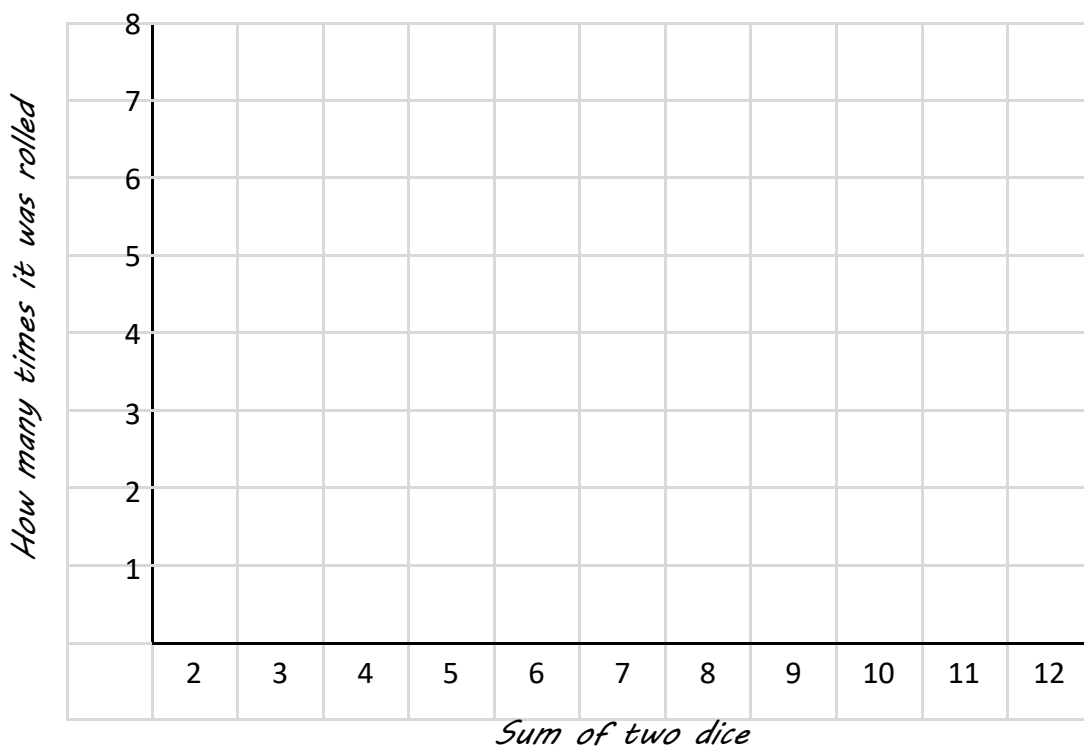
Roll the Die

You will need:

A die

Instructions:

Roll a die twice. Add together the two digits. Use a tally to record the total on the table below.

Repeat this 20 times.

Total	2	3	4	5	6	7	8	9	10	11	12
Tally											

Total the tallies and complete the bar graph with the information.

How many times it was rolled (y-axis: 1, 2, 3, 4, 5, 6, 7, 8)

Sum of two dice (x-axis: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)

Which numbers were rolled the most?

Pupil's comments

Parent's comments

Notes pages

Notes pages
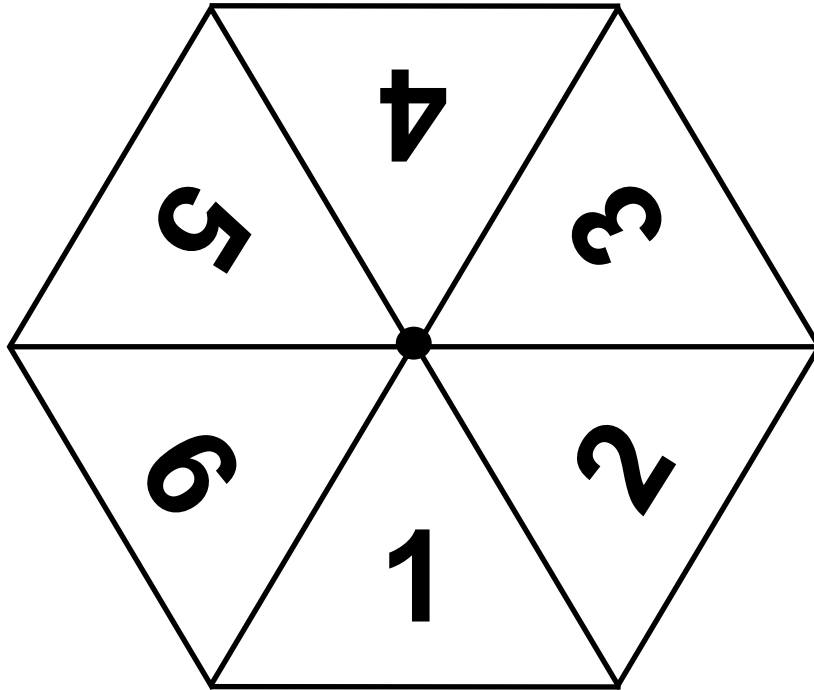
Notes pages

0	1	2	3	4
5	6	7	8	9
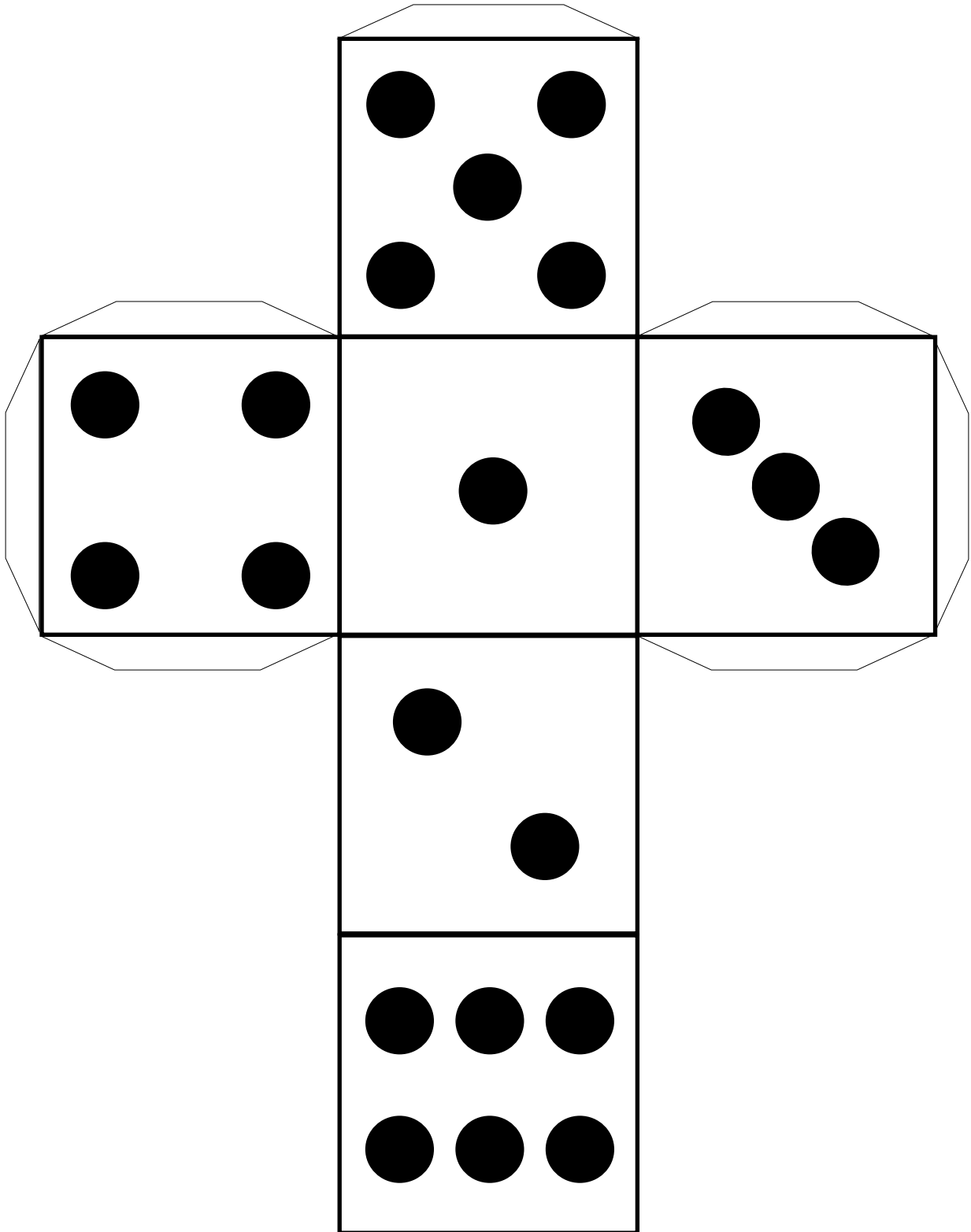
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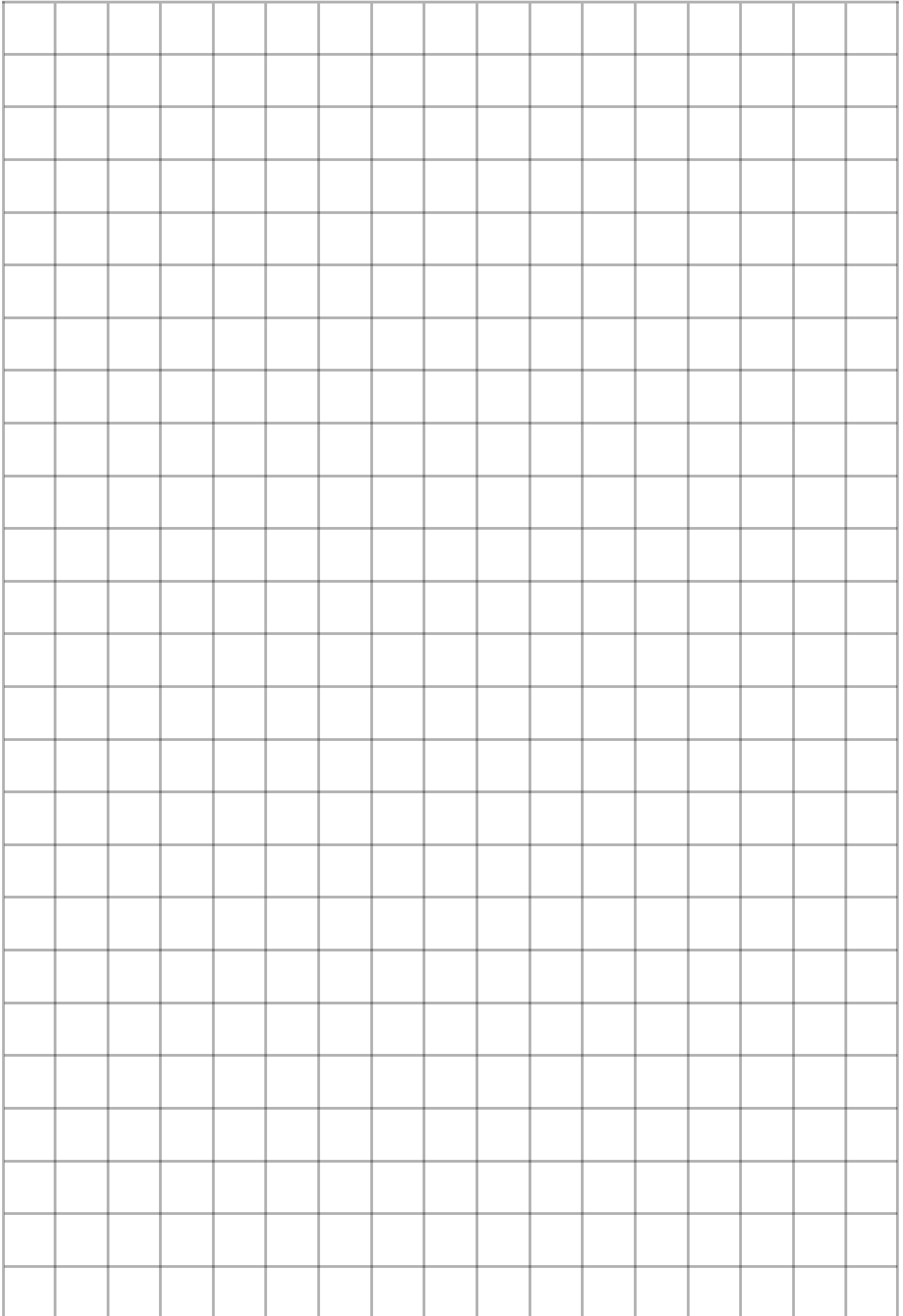| 0	1	2	3	4
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