THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 3 | Week 5

This week, the new Year 3 objectives that are introduced continue to focus on **addition and subtraction**, with the addition and subtraction questions becoming increasingly more complex.

Year 3 objectives introduced in a reasoning context for the first time this week include:

- addition and subtraction of numbers of up to three digits (where appropriate, children should be encouraged to use the formal written methods of columnar addition and/or subtraction).

The following Year 3 objectives continue to be a focus from week 4:

- adding and subtracting numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds.

Objectives from *Fluent in Five* that are also tested in a reasoning context this week include:

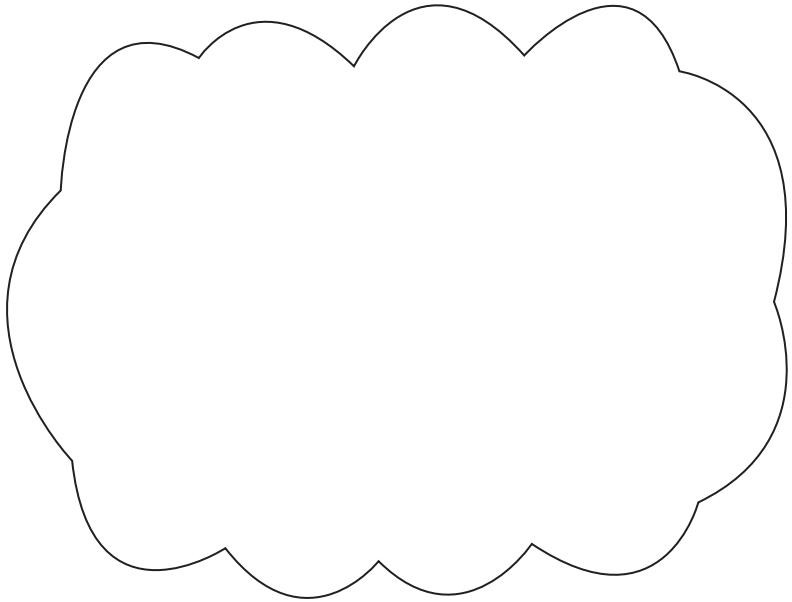
- addition and subtraction of up to three digits, where place value boundaries are crossed.

Please note that some questions are worth two marks, and by their very nature, answers to these questions are never clear-cut. For a full breakdown of how marks would be awarded for these questions, please refer to the mark schemes provided.

Q1 The answer to this calculation is wrong.

$$\begin{array}{r} 635 \\ +\ 236 \\ \hline 861 \end{array}$$

Explain the mistake.



1 mark

Q2 Abby, Ben and Clara are counting out loud from 0. All the children say 0. Then:

Abby counts one jump of 50.

Ben counts seven jumps of 8.

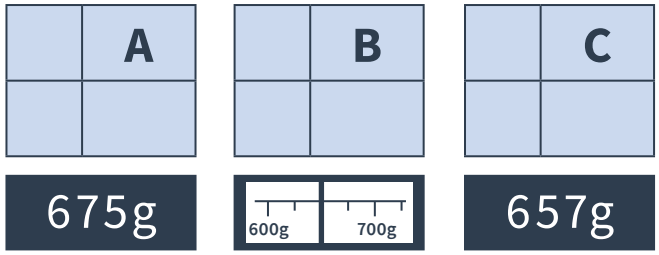
Clara counts twelve jumps of 4.

Who says the highest number?

What is the number?

1 mark

Q3 Here are the masses of three parcels.



Use the symbols >, < or = to compare the masses.

Mass of parcel B ☐ mass of parcel C

Mass of parcel A ☐ mass of parcel C

1 mark

Q1 The answer to this calculation is wrong.

$$\begin{array}{r} 635 \\ +\ 236 \\ \hline 861 \\ \hline \end{array}$$

Explain the mistake.

See mark scheme for examples

1 mark

Q2 Abby, Ben and Clara are counting out loud from 0. All the children say 0. Then:

Abby counts one jump of 50.

Ben counts seven jumps of 8.

Clara counts twelve jumps of 4.

Who says the highest number?

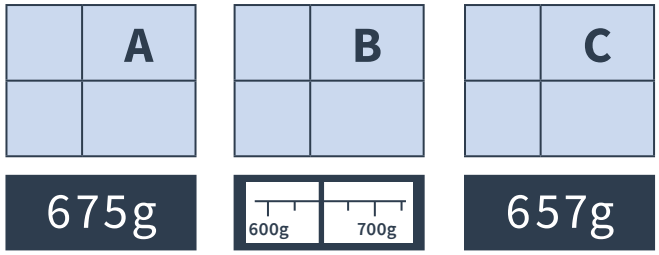
Ben

What is the number?

56

1 mark

Q3 Here are the masses of three parcels.



Use the symbols >, < or = to compare the masses.

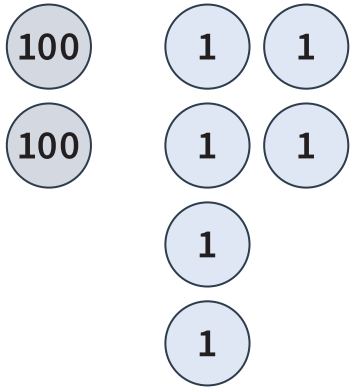
Mass of parcel B [<] mass of parcel C

Mass of parcel A [>] mass of parcel C

1 mark

	Requirement	Mark	Additional guidance
Q1	The ones add up to 11, but the extra ten has not been added to the tens column. The tens should add to make seven, not six.	1	Accept alternative answers as long as they imply that the regrouped 10 needs to be included in the tens total.
Q2	Ben, 56	1	
Q3	<, > **ONE** mark awarded for **BOTH** symbols correctly used.	1	

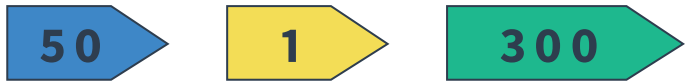
Q1



a Write this number **using numerals.**

_____

1 mark



b Write this number **using words.**

_____

_____

_____

_____

1 mark

Q2

244 439 235

Dylan chooses two of these numbers and adds them together.

The total is 674.

Which two numbers has Dylan added?

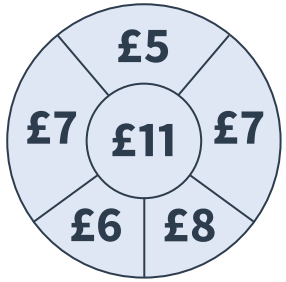
_____ and _____

1 mark

Q3

Tinaya throws three balls at this target.

She scores a total of £25.

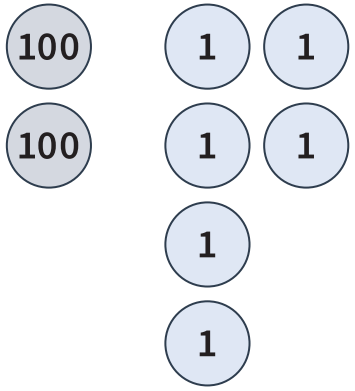


Where do the three balls go?

_____ , _____ and _____

1 mark

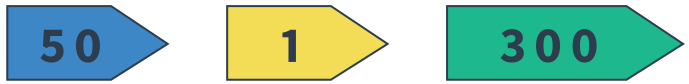
Q1



a Write this number **using numerals.**

206

1 mark



b Write this number **using words.**

Three hundred and fifty-one

1 mark

Q2

244 439 235

Dylan chooses two of these numbers and adds them together.

The total is 674.

Which two numbers has Dylan added?

439 and 235

1 mark

Q3

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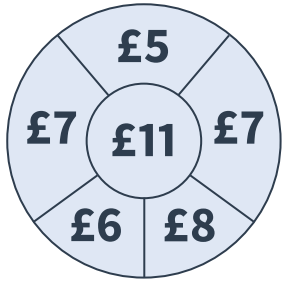


Where do the three balls go?

11 , 7 and 7

1 mark

	Requirement	Mark	Additional guidance
Q1a	206	1	Answer must be written in numerals.
Q1b	Three hundred and fifty-one	1	Answer must be written in words. Hyphen not essential.
Q2	439 and 235	1	Accept numbers given in the opposite order.
Q3	Accept **either** 11, 7 and 7 **OR** 11, 8 and 6	1	Accept numbers given in different orders.

Q1 Complete the missing numbers.

☐ hours are in one day

So, ☐ hours are in two days

and ☐ hours are in half a day.

1 mark

Q2 3 1 9 2 7 0

a Write in **words** the largest three-digit number that you can make from these digits.

_____

_____

1 mark

b Write in **numerals** the smallest three-digit number that you can make from these digits.

☐

1 mark

Q3 237 491 245

India uses subtraction to find the difference between two of these numbers.

The difference is 254.

Which two numbers has India subtracted?

☐ and ☐

1 mark

Q1 Complete the missing numbers.

24 hours are in one day

So, **48** hours are in two days

and **12** hours are in half a day.

1 mark

Q2 3 1 9 2 7 0

a Write in **words** the largest three-digit number that you can make from these digits.

Nine hundred and seventy-three

1 mark

b Write in **numerals** the smallest three-digit number that you can make from these digits.

102

1 mark

Q3 237 491 245

India uses subtraction to find the difference between two of these numbers.

The difference is 254.

Which two numbers has India subtracted?

491 and **237**

1 mark

	Requirement	Mark	Additional guidance
Q1	24, 48, 12	1	
Q2a	Nine hundred and seventy-three	1	
Q2b	102	1	
Q3	491 and 237	1	

Q1 Hatham and Annie have tried to add 572 and 163 using column addition.

They have made two different mistakes.

Hatham:	Annie:
572	572
+ 163	+ 163
5883	635
	1

Explain the mistakes that each person has made.

Hatham's mistake is

_____

_____

Annie's mistake is

_____

_____

2 marks

Q2 This diagram shows how the number 814 changes when there is 200 more or 200 less.

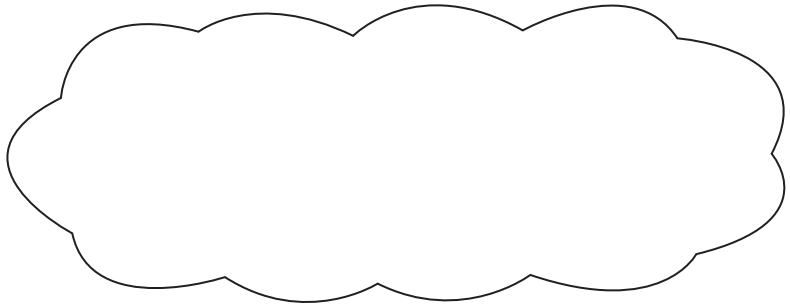
Complete the boxes to show the missing numbers

1 mark

Q3 Georgia says, "An odd number multiplied by five equals an odd number.

An even number multiplied by five equals an even number."

Is Georgia correct? Explain your answer.



1 mark

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They have made two different mistakes.

Hatham:	Annie:
572	572
+ 163	+ 163
5883	635
	1

Explain the mistakes that each person has made.

Hatham's mistake is

See mark scheme for examples

Annie's mistake is

See mark scheme for examples

2 marks

Q2 This diagram shows how the number 814 changes when there is 200 more or 200 less.

Complete the boxes to show the missing numbers

1 mark

Q3 Georgia says, "An odd number multiplied by five equals an odd number.

An even number multiplied by five equals an even number."

Is Georgia correct? Explain your answer.

See mark scheme for examples

1 mark

	Requirement	Mark	Additional guidance
Q1	Hatham's mistake is that he has not lined the two numbers up correctly in three columns, so his addition is wrong. Annie's mistake is that she has forgotten to include the extra hundred underneath. The hundreds digit should be one more than it is. **ONE** mark awarded for each correct identification of the mistake.	2	Accept any explanations that describe the mistakes clearly.
Q2	A = 614 B = 1014	1	
Q3	Yes. Appropriate examples should be given, for example: odd × 5 = odd 7 × 5 = 35 even × 5 = even 10 × 5 = 50	1	Within their explanations, children should give examples to prove each statement (i.e. write an example of an odd number × 5 and an example of an even number × 5).

Q1

$$\begin{array}{r} 531 \\ -\ \square 2 \square \\ \hline 404 \end{array}$$

What are the missing digits in this column subtraction?

☐ ☐

1 mark

Q2

Arrange these number cards so that these two statements make sense.

Only use each number **once**.

684 **486** **468** **648**

☐ < ☐

☐ > ☐

1 mark

Q3

This table shows four activities that Alicia does on Saturday.

A	Watches a film	2 hours & 5 minutes
B	Brushes her teeth	2 minutes
C	Visits her cousin	1 hour
D	Walks the dog	25 minutes

Write the letters A, B C and D in order of shortest to longest activity.

Shortest ⟷ Longest

☐ ☐ ☐ ☐

1 mark

Q1

$$\begin{array}{r} 531 \\ -\ \square 2 \square \\ \hline 404 \end{array}$$

What are the missing digits in this column subtraction?

1	7

1 mark

Q2

Arrange these number cards so that these two statements make sense.

Only use each number **once**.

684	486	468	648

648	<	684

486	>	468

1 mark

Q3

This table shows four activities that Alicia does on Saturday.

A	Watches a film	2 hours & 5 minutes
B	Brushes her teeth	2 minutes
C	Visits her cousin	1 hour
D	Walks the dog	25 minutes

Write the letters A, B C and D in order of shortest to longest activity.

Shortest ⟷ Longest

B	D	C	A

1 mark

	Requirement	Mark	Additional guidance
Q1	1, 7	1	
Q2	Accept any of the following: 648 < 684 **and** 486 > 468 486 < 648 **and** 684 > 468 486 < 684 **and** 648 > 468 468 < 486 **and** 684 > 648 468 < 648 **and** 684 > 486 468 < 684 **and** 648 > 486	1	
Q3	B D C A	1	

What are examiners looking for?

Q1

$$\begin{array}{r} 531 \\ -\ \square 2 \square \\ \hline 404 \end{array}$$

What are the missing digits in this column subtraction?

1	7

1 mark

Why are we asking this question?

This question has been written to assess children's understanding of subtraction of three-digit numbers, in particular, how the column method can be used to subtract and how each digit interacts when using this method.

What common errors do we expect to see?

Some children may not understand how to complete the missing ones digit. These children will either show some comprehension that 1 one subtract a number of ones cannot possibly give an answer of 4 ones (and will leave the box blank) or will attempt to find a number that can be 'subtracted upwards' (in this case, completing the missing digit with a 5 because 5 – 1 = 4).

Some children may become confused by the completed part of the calculation. The tens column shows 3 tens subtract 2 tens equalling 0 tens, which they may not understand. Children may attempt to alter some of the known digits in the calculation so that it makes sense to them.

How to encourage children to solve this question

In order to answer this question successfully, children need to apply their knowledge of column subtraction — in particular the need to partition when the second digit in a column is larger than the first.

Ask: What if the missing ones digit is larger? What would happen to the 1 if this was the case? So, what is the missing digit?

Encourage children to write over the illustration, crossing through the 3 to show partitioning and thereby making it clear how the difference of 0 is now possible in the tens column.

It is important to note that reasoning about column subtraction is not the only way to solve this problem. The question is, in effect, asking 531 − ? = 404 and children who recognise this may also recognise that they can rearrange to find the answer using the numbers that they already know (531 − 404 = ?). This calculation is achievable mentally (− 400, then − 4) and children who use this method will still identify the missing digits when they find the answer of **1**2**7**.

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Rapid Reasoning

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