THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 3 | Week 2

As this is still early on in the introduction of *Rapid Reasoning*, children should be continuing to focus on increasing their reasoning confidence each day.

The Year 3 objectives introduced this week continue to focus on **place value**. As with all weeks of *Rapid Reasoning*, content continues to be covered from across the maths curriculum.

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

- comparing and ordering numbers (up to 1,000), including using the < , > and = signs
- finding 10 or 100 more or less than a given number (children should be encouraged to use their knowledge of place value in order to do this).

The following Year 3 objectives continue to be a focus from week 1:

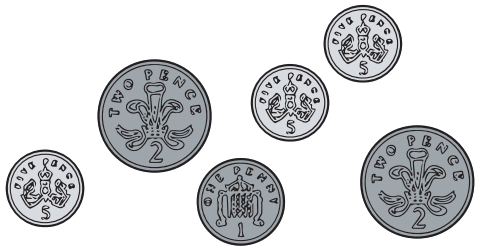
- reading and writing numbers up to 1,000 in numerals and words (extending from number 0 up to 100 from Year 2)
- recognising the place value of each digit in a three-digit number (extending from a two-digit number in Year 2).

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

- addition and subtraction of two-digit numbers
- the inverse relationship between addition and subtraction.

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 Kieran has these coins.



He wants to buy a sticker for 15p.

Write two ways Kieran could make 15p using his coins.

2 marks

Q2

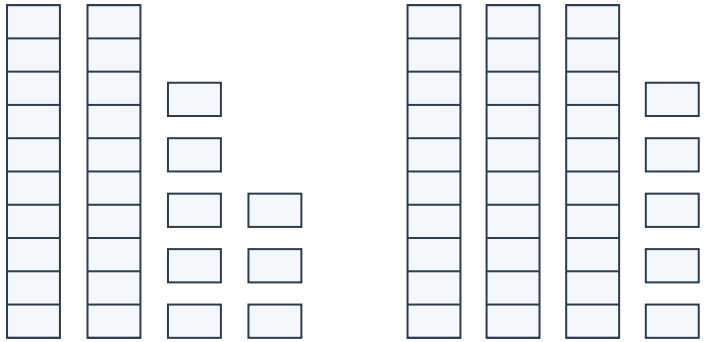
124	490	502
one hundred and twenty-four	four hundred and nineteen	five hundred and two

One of these numbers has been labelled wrongly using words. Which number is it?

1 mark

Q3

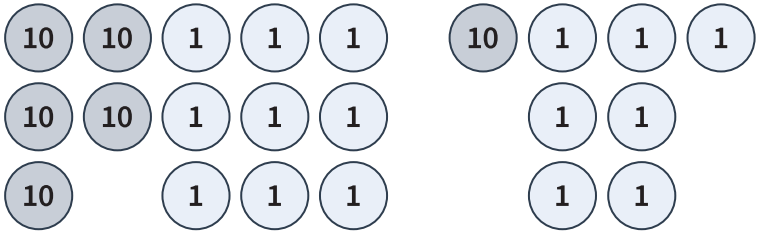
a



What is 28 + 35?

1 mark

b

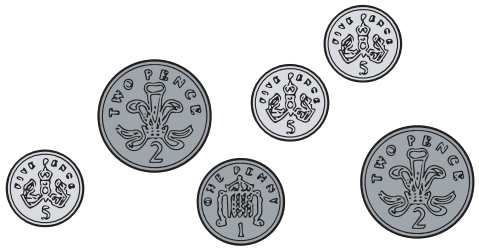


What is 59 + 17?

1 mark

Q1

Kieran has these coins.



He wants to buy a sticker for 15p.

Write two ways Kieran could make 15p using his coins.

See mark scheme for examples

2 marks

Q2

124	490	502
one hundred and twenty-four	four hundred and nineteen	five hundred and two

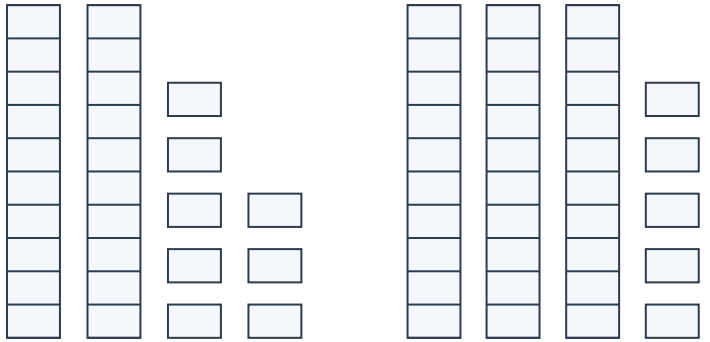
One of these numbers has been labelled wrongly using words. Which number is it?

490

1 mark

Q3

a

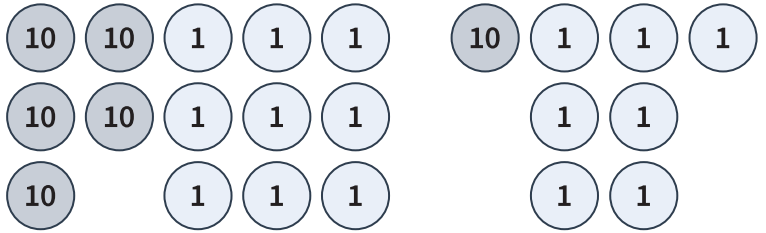


What is 28 + 35?

63

1 mark

b



What is 59 + 17?

76

1 mark

	Requirement	Mark	Additional guidance
Q1	Accept any **TWO** of the following: 10p + 5p 10p + 2p + 2p + 1p 5p + 5p + 2p + 2p + 1p	2	Combinations may be written in different orders (e.g. 5p + 10p). However, each answer should be a unique combination of coins.
Q2	490	1	
Q3a	63	1	
Q3b	76	1	

Q1 Write the symbols >, < or = to make these statements correct.

527 ☐ 521

362 ☐ 300 + 60 + 2

902 ☐ 920

1 mark

Q2 Jessica is 14 years old.

Her cousin is 7 years older than Jessica.

How old is Jessica's cousin?

☐ years old

1 mark

Q3 There are 7 girls and 5 boys in a class.

Half of the children in the class have school dinners.

How many children have school dinners?

☐ children

1 mark

Q1 Write the symbols >, < or = to make these statements correct.

527 [>] 521

362 [=] 300 + 60 + 2

902 [<] 920

1 mark

Q2 Jessica is 14 years old.

Her cousin is 7 years older than Jessica.

How old is Jessica's cousin?

21 years old

1 mark

Q3 There are 7 girls and 5 boys in a class.

Half of the children in the class have school dinners.

How many children have school dinners?

6 children

1 mark

	Requirement	Mark	Additional guidance
Q1	527 > 521 362 = 300 + 60 + 2 902 < 920 **ONE** mark awarded for all three correct symbols.	1	
Q2	21	1	
Q3	6	1	

Q1 Which one of these calculations is the odd one out?

A) ☐ − 35 = 21

B) 43 + ☐ = 78

C) 11 + 47 = ☐

D) ☐ − 19 = 15

Think about what you need to do to find each answer.

Calculation ☐ is the odd one out

because _____

_____

_____

1 mark

Q2 Harry thinks of a number and adds 100 to it.

Joe thinks of a number and subtracts 10 from it.

Both children end up with the number 491.

Which numbers did Harry and Joe start with?

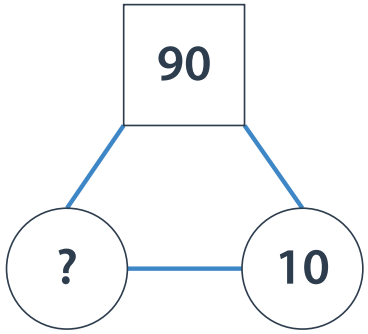
Harry's number = ☐

Joe's number = ☐

1 mark

Q3 This is a multiplication fact triangle.

The two numbers in circles multiply together to make the number in the square.



a What is the missing number?

☐

1 mark

b Use the fact triangle to write a multiplication number sentence and a division number sentence.

☐ × ☐ = ☐

☐ ÷ ☐ = ☐

1 mark

Q1 Which one of these calculations is the odd one out?

A) ☐ − 35 = 21

B) 43 + ☐ = 78

C) 11 + 47 = ☐

D) ☐ − 19 = 15

Think about what you need to do to find each answer.

Calculation ☐ is the odd one out

because _____

See mark scheme for examples

1 mark

Q2 Harry thinks of a number and adds 100 to it.

Joe thinks of a number and subtracts 10 from it.

Both children end up with the number 491.

Which numbers did Harry and Joe start with?

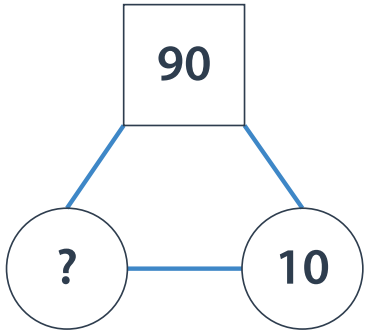
Harry's number = 391

Joe's number = 501

1 mark

Q3 This is a multiplication fact triangle.

The two numbers in circles multiply together to make the number in the square.



a What is the missing number?

9

1 mark

b Use the fact triangle to write a multiplication number sentence and a division number sentence.

10 × 9 = 90

90 ÷ 10 = 9

1 mark

	Requirement	Mark	Additional guidance
Q1	Various answers possible. For the mark, one calculation should be given, together with an appropriate reason for why it is the odd one out.	1	The aim of this question is to get children looking at the different inverse operations needed to solve the missing number problems. All calculations can be solved by **adding** the two known numbers apart from calculation B, where the smaller number needs to be **subtracted** from the larger number instead.
Q2	391, 501 **ONE** mark awarded for both correct answers.	1	
Q3a	9	1	
Q3b	$10 \times 9 = 90$ **OR** $9 \times 10 = 90$ $90 \div 10 = 9$ **OR** $90 \div 9 = 10$ **ONE** mark awarded for both correct answers.	1	

Q1 In which calculation will the most digits change? Explain your answer.

A) 390 + 100

B) 735 + 10

C) 641 – 100

D) 203 – 10

Most digits will change in calculation ☐

because _____

_____

1 mark

Q2 Georgia rolls a six-sided dice three times.

She adds the three numbers together.

Georgia's total is **odd** and is **more than 13.**

Which numbers could Georgia have rolled?

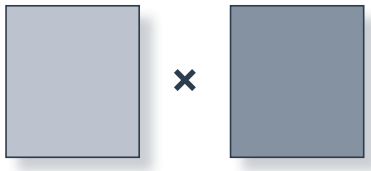
Give two possible answers.

☐ , ☐ and ☐

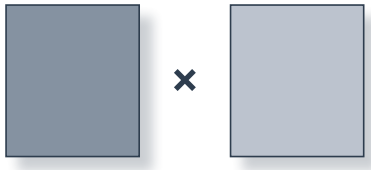
☐ , ☐ and ☐

1 mark

Q3 Abdul takes two different digit cards and multiplies them together.



Abdul swaps the cards around and says, "It makes the same answer!"



Is Abdul right? Explain your answer.

Yes ☐ No ☐

1 mark

Q1 In which calculation will the most digits change? Explain your answer.

A) 390 + 100 C) 641 – 100

B) 735 + 10 D) 203 – 10

Most digits will change in calculation **D**

because _____

See mark scheme for examples

1 mark

Q2 Georgia rolls a six-sided dice three times.

She adds the three numbers together.

Georgia's total is **odd** and is **more than 13.**

Which numbers could Georgia have rolled?

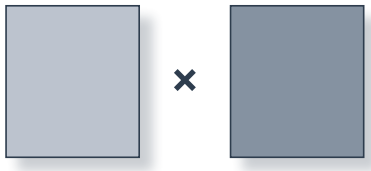
Give two possible answers.

6, **6** and **3**

6, **5** and **4**

1 mark

Q3 Abdul takes two different digit cards and multiplies them together.



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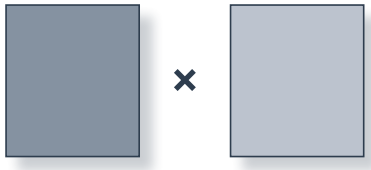

Is Abdul right? Explain your answer.

Yes ✓ No ☐

See mark scheme for examples

1 mark

	Requirement	Mark	Additional guidance
Q1	D Appropriate explanation given (see guidance).	1	Explanation should refer to the fact that calculation D crosses a tens (and hundreds) boundary and so two digits will change. None of the other calculations cross a tens or hundreds boundary and only one digit changes in these. Also accept explanations through numbers, for example 203 – 10 = 193, so two digits have changed.
Q2	Any **TWO** answers from the following four combinations: 6, 6 and 3 6, 6 and 5 6, 5 and 4 5, 5 and 5 **ONE** mark awarded for two correct and unique combinations.	1	Combinations may be given in different orders, but these are not different answers (for example, 6, 5 and 4 is the same answer as 5, 4 and 6).
Q3	Yes, because numbers will give the same answer even if they are multiplied in a different order.	1	Appropriate explanation to be given, making mention of the fact that multiplications can be calculated in different orders and still give the same amount (commutative law) and/or give an example (e.g. 5 × 3 = 3 × 5). Do **NOT** award a mark for just yes or no answer.

What are examiners looking for?

Q1 In which calculation will the most digits change? Explain your answer.

A)	390 + 100	C)	641 – 100
B)	735 + 10	D)	203 – 10

Most digits will change in calculation **D**

because _____

See mark scheme for examples

1 mark

Why are we asking this question?

This question is designed to test whether children can find 10 or 100 more or less than a given three-digit number. We want children to show that they understand the effect that moving in 10s or 100s can have on a number (in particular, recognising what happens when the answer crosses the hundreds boundary).

What common errors do we expect to see?

We'd expect to see some children limiting the effect of an addition or subtraction to only the column being added to (or subtracted from). In these cases, children may show some understanding of how the digits change as they move forwards or backwards. For example, they know that 203 – 10 will give an answer where the tens digit is a 9. However, they do not alter the hundreds digit and recognise that they have crossed into the previous hundred. They will therefore struggle to answer the question correctly as they will not calculate the answer to 203 – 10 as 193, but 293 instead. Practice with number lines may be advisable with this misconception, so children can see numbers as a continuum and recognise the effect of crossing a hundreds boundary.

We'd expect some children to think that the larger the number being added or subtracted, the greater the effect on the starting numbers. These children may suggest that both calculations A and C will change the most digits because they are both calculating with 100 and this has more digits than 10. If you notice children making this mistake, give them plenty of experiences using digit cards where they physically

change digits as each number is added or subtracted. Being able to physically model the question "How many digits have changed?" should help embed the concept.

How to encourage children to solve this question

First, it is important to ensure that children understand the task, recognising that they must calculate each answer before considering the number of digits that have changed in the starting number.

The underlying concept behind the question is that adding or subtracting 10 or 100 will affect the tens or hundreds digit by 1 (leaving the ones digit and, in the case of working with 100 the tens digit, untouched). Encourage children to see this effect by getting them to sketch three-digit place value grids and to write each number within this model. This will help them to visualise what happens when they alter the amount by 10 or 100. Encourage them to think about which columns are affected and which are not. Is this always the case?

H	T	O
6	4	1
1	0	0

In effect, they are creating a column addition or subtraction, within the confines of a place-value grid.

When teaching this concept, ensure children are provided with lots of examples that cross the hundreds boundary (for example: 892 + 10 or 605 − 10). Children should be able to recognise when an addition or subtraction will need more than one digit changing. A useful activity is to ask children to make a three-digit number out of digit cards (for example, 318) and count as quickly as they can in tens, altering their digit cards as they say each new number. Can they predict when they will need to change two digits and not one?

Q1 Both of these numbers are made from the same three digits.

What are the two numbers?

A = ☐

B = ☐

1 mark

Q2 Two of these numbers are **not** in the two times table.

14 17 8 21 24

Which numbers are they?

☐ and ☐

1 mark

Q3 45 children attend after-school football club.

The whole group is split into equal teams of five.

How many teams are there?

☐ teams

1 mark

Q1 Both of these numbers are made from the same three digits.

What are the two numbers?

A = 627

B = 762

1 mark

Q2 Two of these numbers are **not** in the two times table.

14 17 8 21 24

Which numbers are they?

17 and 21

1 mark

Q3 45 children attend after-school football club.

The whole group is split into equal teams of five.

How many teams are there?

9 teams

1 mark

	Requirement	Mark	Additional guidance
Q1	A = 627 B = 762 **ONE** mark awarded for **BOTH** correct answers.	1	
Q2	17 and 21	1	Order of numbers does not matter.
Q3	9	1	

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Rapid Reasoning

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