

THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 5 | Week 4

This week, the new Year 5 objectives that are introduced focus on **addition and subtraction** for the first time.

Year 5 objectives introduced in a reasoning context for the first time this week include:

- adding and subtracting numbers with more than four digits, including using formal written methods where they are appropriate
- using rounding to check answers to calculations and make estimations.

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

- written addition and subtraction
- solving problems involving Year 5 level multiplication and division.

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

Jamie reads two books over the summer holidays. One is 256 pages long and the other is 185 pages long.

Milly reads one book that is 298 pages long.

What is the **difference** in the number of pages that both children have read?

pages

2 marks

Q2

Ruff's Dog Food Company made a profit of £60,978 last year.

This year the company made a profit of £72,892.

How much **more** profit has the company made this year?

1 mark

Q3

This table shows the scores that four children achieve when playing a computer game.

Name	Score
Aaliyah	620
Kian	480
Molly	570
Ryan	590

a

Which two children achieve a **combined score** of 1,070?

1 mark

b

Which two children achieve a **combined score** of 1,100?

1 mark

Q1

Jamie reads two books over the summer holidays. One is 256 pages long and the other is 185 pages long.

Milly reads one book that is 298 pages long.

What is the **difference** in the number of pages that both children have read?

143 pages

2 marks

Q2

Ruff's Dog Food Company made a profit of £60,978 last year.

This year the company made a profit of £72,892.

How much **more** profit has the company made this year?

£11,914

1 mark

Q3

This table shows the scores that four children achieve when playing a computer game.

Name	Score
Aaliyah	620
Kian	480
Molly	570
Ryan	590

a

Which two children achieve a combined score of 1,070?

Kian and Ryan

1 mark

b

Which two children achieve a combined score of 1,100?

Aaliyah and Kian

1 mark

	Requirement	Mark	Additional guidance
Q1	143 pages Award TWO marks for the correct answer of 143 pages. Award ONE mark for a correct method, with up to one arithmetic error.	2	
Q2	£11,914	1	
Q3a	Kian and Ryan	1	Names may be in any order.
Q3b	Aaliyah and Kian	1	Names may be in any order.

Q1 This table shows the number of visitors to different sites of historical interest last year.

Historical site	Visitors last year
Cathedral	35,679
Roman remains	48,332
Castle	59,983
Standing stones	23,475

a How many people visited the cathedral and the castle in total last year?

1 mark

b One site had 12,204 more visitors last year than another. What were the two sites?

and

1 mark

Q2 Lucas thinks of a multiplication fact where the sum of the digits in the answer is 10. Lucas is only working up to 12×12 and his answer has two digits.

Write two possible multiplication facts that Lucas could be thinking of.

1 mark

Q3

673 people attend a rock concert.

Each ticket costs £5.

The organisers use this money to pay the costs of putting on the concert and then keep what is left over.

The cost of putting on the concert is £1,898.

How much money do the organisers make?



2 marks

Q1 This table shows the number of visitors to different sites of historical interest last year.

Historical site	Visitors last year
Cathedral	35,679
Roman remains	48,332
Castle	59,983
Standing stones	23,475

a How many people visited the cathedral and the castle in total last year?

95,662 visitors

1 mark

b One site had 12,204 more visitors last year than another. What were the two sites?

Cathedral

and

Standing stones

1 mark

Q2 Lucas thinks of a multiplication fact where the sum of the digits in the answer is 10. Lucas is only working up to 12×12 and his answer has two digits.

Write two possible multiplication facts that Lucas could be thinking of.

$4 \times 7 = 28$

$11 \times 5 = 55$

1 mark

Q3

673 people attend a rock concert.

Each ticket costs £5.

The organisers use this money to pay the costs of putting on the concert and then keep what is left over.

The cost of putting on the concert is £1,898.

How much money do the organisers make?

£ **1,467**

2 marks

	Requirement	Mark	Additional guidance
Q1a	95,662 visitors	1	
Q1b	Cathedral and Standing stones	1	
Q2	Accept any of the following facts: $4 \times 7 = 28$ $7 \times 4 = 28$ $11 \times 5 = 55$ $5 \times 11 = 55$ $8 \times 8 = 64$	1	
Q3	£1,467 Award TWO marks for a correct answer. Award ONE mark for a correct method, but with arithmetic errors. Correct method involves multiplying 673×5 to find the total amount of money made by selling tickets (£3,365) and then subtracting £1,898 to find the amount that is left after the costs have been taken off (£1,467).	2	

Q1

Fran wants to make a **rectangular** enclosure for her rabbit to run around in the garden safely.

She has 20m of wire fence.

The length and width of the rectangle must be in whole metres.

Explain how Fran could find all the possible rectangles she could make using the wire.

1 mark

Q2

A library starts the day with 2,475 books on its shelves.

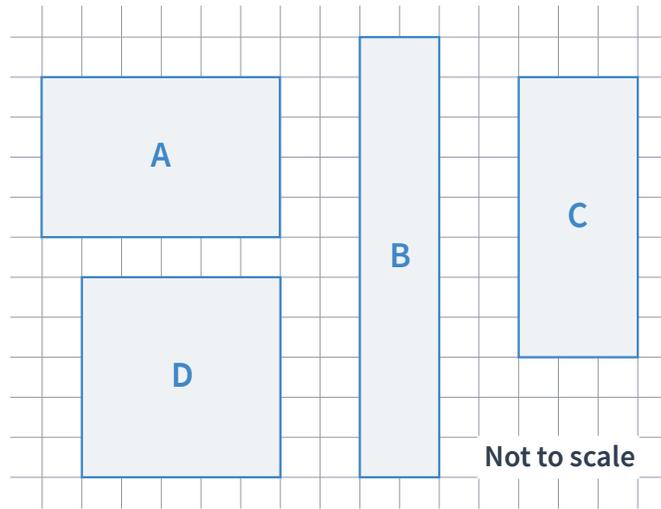
During the day, 890 books are loaned out and 631 books are returned back to the library and put back on the shelves.

How many books are on the library's shelves at the end of the day?

1 mark

Q3

Four pieces of paper are placed on a 1cm square grid.



Complete the table to show the areas of the pieces of paper.

Shape	Area (cm ²)
A	
B	
C	
D	

2 marks

Q1

Fran wants to make a **rectangular** enclosure for her rabbit to run around in the garden safely.

She has 20m of wire fence.

The length and width of the rectangle must be in whole metres.

Explain how Fran could find all the possible rectangles she could make using the wire.

See mark scheme for examples

1 mark

Q2

A library starts the day with 2,475 books on its shelves.

During the day, 890 books are loaned out and 631 books are returned back to the library and put back on the shelves.

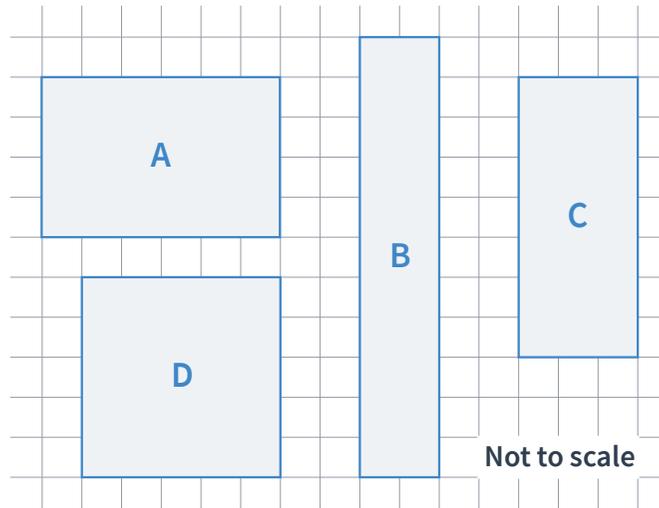
How many books are on the library's shelves at the end of the day?

2,216 books

1 mark

Q3

Four pieces of paper are placed on a 1cm square grid.



Complete the table to show the areas of the pieces of paper.

Shape	Area (cm ²)
A	24cm ²
B	22cm ²
C	21cm ²
D	25cm ²

2 marks

	Requirement	Mark	Additional guidance										
Q1	<p>Explanation should describe a methodical approach to finding the answer. For example:</p> <ul style="list-style-type: none"> – Fran could use a table to record all the different lengths and widths that give a perimeter of 20m. – Fran could start with a width of 1m and a length of 9m and then increase the width by 1m each time to find all the possibilities. 	1	This is an open-ended question and has been designed to encourage children to use reasoning to describe how to make sure that they find all possibilities when investigating perimeter.										
Q2	2,216 books	1											
Q3	<table border="1"> <thead> <tr> <th>Shape</th> <th>Area (cm²)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>24cm²</td> </tr> <tr> <td>B</td> <td>22cm²</td> </tr> <tr> <td>C</td> <td>21cm²</td> </tr> <tr> <td>D</td> <td>25cm²</td> </tr> </tbody> </table> <p>Award ONE mark for two or three correct areas. BOTH marks for all correct.</p>	Shape	Area (cm ²)	A	24cm²	B	22cm²	C	21cm²	D	25cm²	2	
Shape	Area (cm ²)												
A	24cm²												
B	22cm²												
C	21cm²												
D	25cm²												

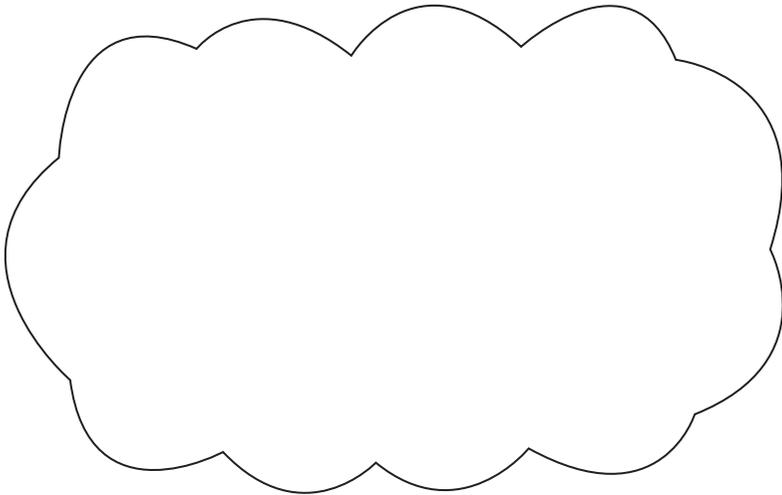
Q1 Rhys, Jacob and Anaya are estimating the answer to $5,497 - 3,202$.

Rhys estimates 2,000.

Jacob estimates 2,800.

Anaya estimates 2,300.

Who has made the best estimate? Explain your answer.



1 mark

Q2 A football team want to buy a new player for £620,580.

They already have £398,579 in the bank.

How much more money do they need to be able to buy the player?

1 mark

Q3

Robert, Josie and Tinaya are putting counters on the same hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Robert puts counters on every multiple of 6.

Josie puts counters on every multiple of 9.

Tinaya puts counters on every multiple of 7.

a

How many squares will have two counters on?

1 mark

b

How many squares will have three counters on?

1 mark

Q1 Rhys, Jacob and Anaya are estimating the answer to $5,497 - 3,202$.

Rhys estimates 2,000.

Jacob estimates 2,800.

Anaya estimates 2,300.

Who has made the best estimate? Explain your answer.

*See mark scheme
for examples*

1 mark

Q2 A football team want to buy a new player for £620,580.

They already have £398,579 in the bank.

How much more money do they need to be able to buy the player?

£222,001

1 mark

Q3

Robert, Josie and Tinaya are putting counters on the same hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Robert puts counters on every multiple of 6.

Josie puts counters on every multiple of 9.

Tinaya puts counters on every multiple of 7.

a

How many squares will have two counters on?

8

1 mark

b

How many squares will have three counters on?

0

1 mark

	Requirement	Mark	Additional guidance
Q1	Anaya has made the best estimate because 5,497 can be rounded to 5,500, 3,202 can be rounded to 3,200 and the difference can be then estimated as $5,500 - 3,200 = 2,300$.	1	
Q2	£222,001	1	
Q3a	8	1	
Q3b	0	1	

What are examiners looking for?

Q1 Rhys, Jacob and Anaya are estimating the answer to $5,497 - 3,202$.

Rhys estimates 2,000.

Jacob estimates 2,800.

Anaya estimates 2,300.

Who has made the best estimate? Explain your answer.

Anaya, because 5,497 can be rounded to 5,500, 3,202 can be rounded to 3,200 and the difference between these two numbers is 2,300.

1 mark

Why are we asking this question?

This question has been written to test children's ability to reasonably estimate the answer to calculations involving numbers with four digits.

What common errors do we expect to see?

Some children may think that each number is best rounded by taking the thousands digit and replacing the other digits with zeros. In this calculation, this has the same effect as rounding to the nearest thousand, but it is not always the case. These children give the answer 'Rhys' because 5,497 becomes 5,000, 3,202 becomes 3,000 and the difference is 2,000.

Some children may miscalculate when calculating with their rounded numbers. For example, if they round 5,497 to the nearest 1,000, they may think that Jacob's estimate is best because they think $5,000 - 3,202$ will be about 2,800 (they have seen the 5 and the 3 and incorrectly presumed that the answer will have a 2 in the thousands column).

How to encourage children to solve this question

First, children need to be aware that estimating the answer to a calculation will require some degree of rounding.

In order to round a number accurately, children may need to remind themselves of the 'rules of rounding':

- Any digit between 1 and 4 rounds down and any digit between 5 and 9 rounds up.
- The smaller the rounding, the more accurate the estimate (i.e. rounding a number to the nearest 1,000, for example, will give a less accurate estimation than rounding a number to the nearest 10 or 100).

Some children may find it useful to sketch number lines in order to locate the numbers in the calculation and visualise where best to round them to, although this is more useful as a demonstration of estimation rather than a tool to estimate with.

It is important that children do estimate the answer to this problem, rather than calculate the actual answer and then look for the best estimate. This defeats the whole purpose of estimation as a quick strategy to find a rough answer.

Q1 Lottie, Jamil and Sara each write down a three-digit number.

Lottie's number is 486 less than Sara's number.

The total of Jamil and Sara's numbers is 1,738.

Jamil's number is 844.

What are Lottie and Sara's numbers?

Lottie =

Sara =

2 marks

Q2 A cycle track is 355 metres all the way around.

Mia cycles around the track 9 times.

How far does Mia cycle in metres?

m

1 mark

Q3 This machine counts in multiples of 25.



Circle the numbers it will not show.

350 75 705 775 520

1 mark

Q1 Lottie, Jamil and Sara each write down a three-digit number.

Lottie's number is 486 less than Sara's number.

The total of Jamil and Sara's numbers is 1,738.

Jamil's number is 844.

What are Lottie and Sara's numbers?

Lottie =	408
Sara =	894

2 marks

Q2 A cycle track is 355 metres all the way around.

Mia cycles around the track 9 times.

How far does Mia cycle in metres?

3,195	m
--------------	---

1 mark

Q3 This machine counts in multiples of 25.

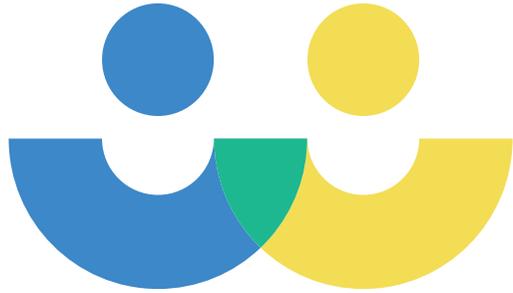


Circle the numbers it will not show.

350 75 **705** 775 **520**

1 mark

	Requirement	Mark	Additional guidance
Q1	Lottie = 408 Sara = 894 Award TWO marks for both correct answers. Award ONE mark for a complete method with one arithmetic error OR for one child's number being correct.	2	
Q2	3,195m	1	
Q3	705 and 520	1	



THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Do you have a group of pupils who need a boost in maths this term?

Each pupil could receive a personalised lesson every week from our specialist 1-to-1 maths tutors.

- Raise attainment
- Plug any gaps or misconceptions
- Boost confidence

Speak to us:

 thirdspacelearning.com

 0203 771 0095

 hello@thirdspacelearning.com