THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 3 | Week 6

This week, the new Year 3 objectives that are introduced continue to focus on **addition and subtraction**, with children being encouraged to use their place value and known number facts alongside their new addition and subtraction skills.

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

- solving problems, including where there are missing number problems, using their number facts, place value and more complex addition and subtraction.

The following Year 3 objective continues to be a focus from week 5:

- 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).

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

- calculating statements for 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 There are 473 pages in a book.

Isla has read 282 pages.

How many pages does Isla have left?

_____
1 mark

Q2 Liam moves a counter across a hundred square, starting at 4.

He counts in fours each time.

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

Which of these numbers will Liam's counter land on? Circle your answer.

24   42   52   62

_____
1 mark

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Q3   Jamie has three coins.

How much money does Jamie have altogether?

£ _____

1 mark

Q1 There are 473 pages in a book.

Isla has read 282 pages.

How many pages does Isla have left?

191 pages

1 mark

Q2 Liam moves a counter across a hundred square, starting at 4.

He counts in fours each time.

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

Which of these numbers will Liam's counter land on? Circle your answer.

24   42   52   **62**

1 mark

Q3   Jamie has three coins.

How much money does Jamie have altogether?

£   **1.10**

_____
1 mark

	Requirement	Mark	Additional guidance
Q1	191 pages	1	
Q2	24 and 62	1	
Q3	£1.10	1	Do **NOT** accept answers expressed using both units of measurement (£1.10p or £1 10p). Accept 110p, £1.10p, but not £110p or £110.

Q1 Look at the number sentences below.

$370 + \boxed{} = 770$

$531 + \boxed{} = 571$

$623 + \boxed{} = 627$

a Complete the three missing numbers.

1 mark

b Add the three missing numbers together. What is their total?

$\boxed{}$

1 mark

Q2

A: B:

```
    6 4 9        5 7 3
  +   2 1 5    +   2 9 6
  ─────────    ─────────
    8 5 4        8 6 9
      1            1
```

Tick the statement(s) that describes these calculations.

BOTH calculations are correct. ☐

Calculation A is incorrect. ☐

Calculation B is incorrect. ☐

1 mark

Q3   64p   36p   46p   14p   40p

Show **two** ways to make £1 using these amounts.

$\vdots\boxed{}$

$\vdots\boxed{}$

2 marks

Q1 Look at the number sentences below.

370 + [**400**] = 770

531 + [**40**] = 571

623 + [**4**] = 627

a Complete the three missing numbers.

_____
1 mark

b Add the three missing numbers together. What is their total?

[**444**]

_____
1 mark

Q2

A:
```
   649
+  215
  ─────
   854
     1
```

B:
```
   573
+  296
  ─────
   869
     1
```

Tick the statement(s) that describes these calculations.

BOTH calculations are correct. [ ]

Calculation A is incorrect. [✓]

Calculation B is incorrect. [ ]

_____
1 mark

Q3 64p 36p 46p 14p 40p

Show **two** ways to make £1 using these amounts.

64p + 36p

46p + 40p + 14p

_____
2 marks

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|	Requirement	Mark	Additional guidance
Q1a	400, 40 and 4	1	
Q1b	444	1	
Q2	A is incorrect	1	
Q3	64p + 36p 46p + 40p + 14p	2	Answers may be written in different orders, for example 14p + 40p+ 46p. Accept answers that show understanding of the additions needed, for example no use of 'p' symbol: 36 + 64

Q1 Which of the problems below is the odd one out? Tick your chosen box and then explain your answer.

What are eight twos? ☐

How many fives are in 30? ☐

What is four times 10? ☐

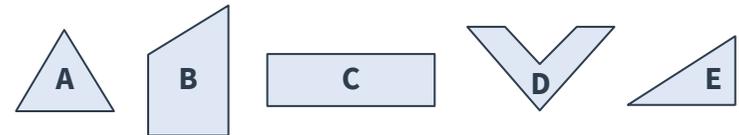If there are nine groups of two, how many are there altogether? ☐
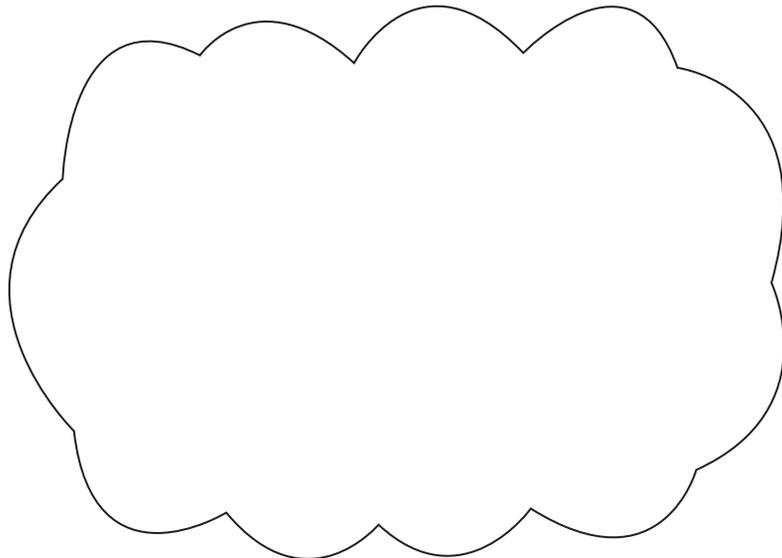
1 mark

Q2 There are 82 cars in a car park.

A number of cars drive out.

There are 46 cars left.

How many cars drive out of the car park?

1 mark

Q3

Which of these shapes have vertical line symmetry?

_____

1 mark

Q1 Which of the problems below is the odd one out? Tick your chosen box and then explain your answer.

What are eight twos? ☐

How many fives are in 30? ☑

What is four times 10? ☐

If there are nine groups of two, how many are there altogether? ☐

See mark scheme for examples

1 mark

Q2 There are 82 cars in a car park.

A number of cars drive out.

There are 46 cars left.

How many cars drive out of the car park?

36

1 mark

Q3

A   B   C   D   E

Which of these shapes have vertical line symmetry?

A, C and D

1 mark

	Requirement	Mark	Additional guidance
Q1	How many fives are in 30? This is the odd one out because all the others are solvable by writing multiplication number sentences. This is solved by writing a division number sentence.	1	Encourage children to consider the number sentences they would use to solve each problem.
Q2	36	1	
Q3	A, C and D	1	Letters may be given in any order.

Q1

A:
```
  504
−  391
  113
```

B:
```
  609
−  257
  452
```

Tick the statement(s) that describes these calculations.

BOTH calculations are correct. ☐

Calculation A is incorrect. ☐

Calculation B is incorrect. ☐

_____
1 mark

Q2

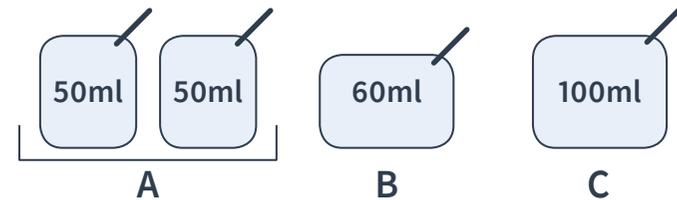| Multiples of 4 | Multiples of 100 |

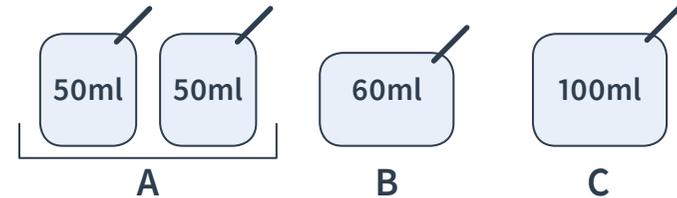| Multiples of 8 | Multiples of 50 |

Put the labels shown at the start of Q2 where they belong in this table.

Always end in 0	Sometimes end in 0	Never end in 0

_____
2 marks

Q3 These containers have different amounts of lemonade in them.

| 50ml | 50ml | | 60ml | | 100ml |

A   B   C

Use the letters A, B and C to compare the amounts.

☐ = ☐

☐ < ☐

_____
1 mark

Q1

A:

$$504 - 391 = 113$$

B:

$$609 - 257 = 452$$

Tick the statement(s) that describes these calculations.

BOTH calculations are correct. ☐

Calculation A is incorrect. ☐

Calculation B is incorrect. ✓

1 mark

Q2

Multiples of 4	Multiples of 100
Multiples of 8	Multiples of 50

Put the labels shown at the start of Q2 where they belong in this table.

Always end in 0	Sometimes end in 0	Never end in 0
Multiples of 100	Multiples of 4	
Multiples of 50	Multiples of 8	

2 marks

Q3 These containers have different amounts of lemonade in them.

50ml 50ml 60ml 100ml
A B C

Use the letters A, B and C to compare the amounts.

A	=	C

B	<	A

1 mark

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	Requirement	Mark	Additional guidance
Q1	B is incorrect. **ONE** mark awarded for each correct identification of the mistake.	1	Accept any explanations that describe the mistakes clearly.
Q2	**Always end in 0:** Multiples of 100 Multiples of 50 **Sometimes end in 0:** Multiples of 4 Multiples of 8 **Never end in 0:** *No labels* **ONE** mark for two or three correctly placed labels. **BOTH** marks for all four.	2	Children should be able to explain why multiples of 100 and 50 are in the same section (and the same for multiples of 4 and 8).
Q3	A = C (or C = A) B < A (or B < C)	1	

Q1 The two sides of this balance are equal.

| 15 + 19 | | ? + 12 |

What is the missing number?

1 mark

Q2 Look at the statements below.

Complete these statements using either × or ÷ .

90 = 10 [ ] 9

10 = 100 [ ] 10

40 [ ] 5 = 8

2 × 7 = 7 [ ] 2

2 marks

Q3 Name of 3D shape: 2D shape on its surface:

cylinder   square

triangular prism   circle

cube   rectangle

Draw lines to match each 3D shape with a 2D shape that appears on its surface.

1 mark

Q1 The two sides of this balance are equal.

| 15 + 19 | ? + 12 |

What is the missing number?

22

1 mark

Q2 Look at the statements below.

Complete these statements using either × or ÷ .

90 = 10 × 9

10 = 100 ÷ 10

40 ÷ 5 = 8

2 × 7 = 7 × 2

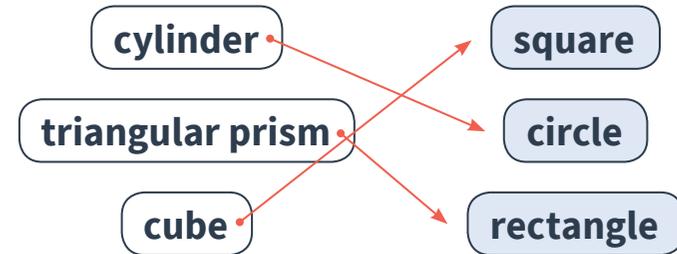2 marks

Q3

Name of 3D shape: 2D shape on its surface:

cylinder → circle

triangular prism → rectangle

cube → square

Draw lines to match each 3D shape with a 2D shape that appears on its surface.

1 mark

	Requirement	Mark	Additional guidance
Q1	22	1	
Q2	× ÷ ÷ × **ONE** mark for two or three correct symbols. **BOTH** marks for all four correct symbols.	2	
Q3	cylinder → circle triangular prism → rectangle cube → square	1	All three should be correctly matched.

What are examiners looking for?

Q1 The two sides of this balance are equal.

| 15 + 19 | ? + 12 |

What is the missing number?

| **22** |
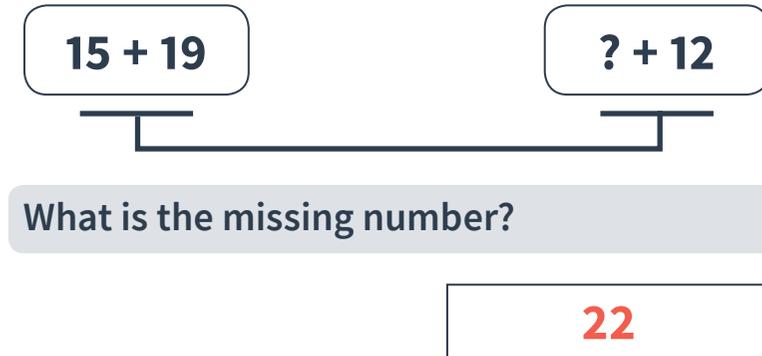
1 mark

Why are we asking this question?

This question has been designed to assess whether children are able to solve addition and subtraction problems containing missing numbers. Even though there is no = sign in the illustration, understanding the meaning of the equals sign in a balanced equation is vital to understanding how to solve the problem.

What common errors do we expect to see?

Some children may look for a pattern between the pairs of numbers. These children may recognise that 12 is 7 less than 19 and look for an answer that is 7 less than 15.

$$15 \quad + \quad 19$$
$$\downarrow \quad - \, 7$$
$$? \quad + \quad 12$$

These children will give an answer of 8. Children who work in this way will have misunderstood the relationship between the numbers (when one number in an addition decreases by 7, the other number needs to increase by 7 for the total to remain the same).

Some children may not be able to relate to the fact that there is no visible = sign. These children will be used to seeing an equals sign followed by a number and using this to derive the missing number. Physical practice of balanced equations (where x + y = a + b) will be beneficial — for example placing 10 + 5 cubes on one side of a set of balances and asking children what additions on the other side will balance the scales.

How to encourage children to solve this question

Encourage children to annotate the illustration. Ask: "Where does the equals sign belong in this picture?"

Having labelled the diagram as 15 + 19 = ? + 12 it is important for children to see 15 + 19 as a numerical value rather than an addition. Encourage them to cross out the left-hand statement and replace it with what it is worth.

When teaching this concept, covering over terms with a sticky label can be useful as well as using actual balances to physically weigh a calculation using Dienes equipment. Children may benefit from sketching the problem as a bar model too:

15	19
?	12

↓

24	
?	12
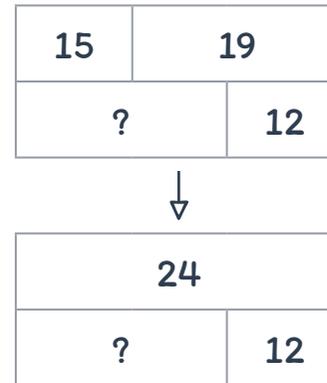
As mentioned above, children who are looking for patterns in the numbers may benefit from further practice learning about the relationship between numbers in additions — in particular that if one number increases by an amount, the other number has to decrease by that same amount for the total to remain the same.
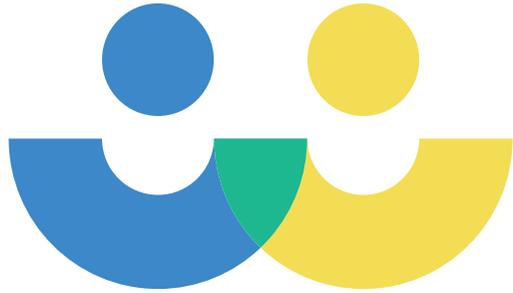
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