THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 6 | Weeks 1–12

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Rapid Reasoning

Year 6 | Week 4

This week, the new Year 6 objectives that are introduced focus on **calculations with all four operations** for the first time.

Year 6 objectives introduced in a reasoning context for the first time this week focus on multiplying numbers with up to four digits by a two-digit whole number.

There are no new addition or subtraction objectives in Year 6, however this week children are also exposed to addition and subtraction questions from the Year 5 curriculum, which involve adding and subtracting numbers with more than four digits.

Children are also exposed to solving multi-step problems, involving a range of calculation skills.

Note that, unlike questions from the arithmetic paper, in reasoning questions the formal method for multiplication/ division is **not** required for the award of method marks.

Q1 Tick all the acute angles.
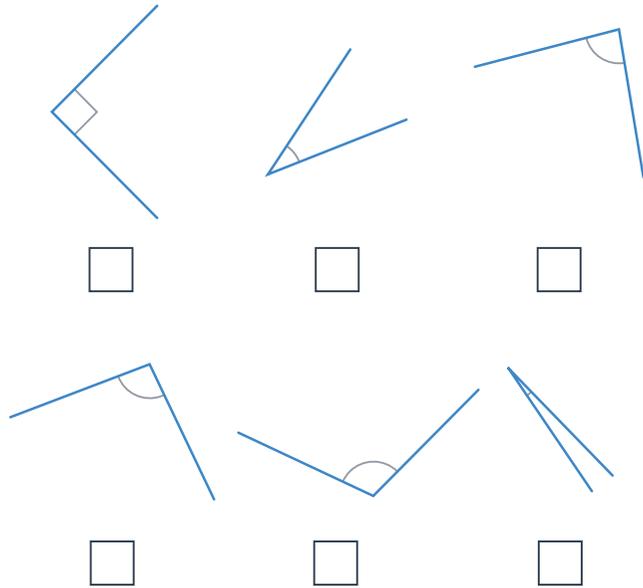
☐   ☐   ☐

☐   ☐   ☐

_____
1 mark

Q2 Fill in the missing boxes in this calculation.

| 5 | 6 | 8 | ☐ |

+ | ☐ | 3 | 4 |

_____

| ☐ | 3 | ☐ | 2 |

_____
2 marks

Q3 A toy shop orders 14 boxes of small bouncy balls.

Each box contains 24 bags of bouncy balls.
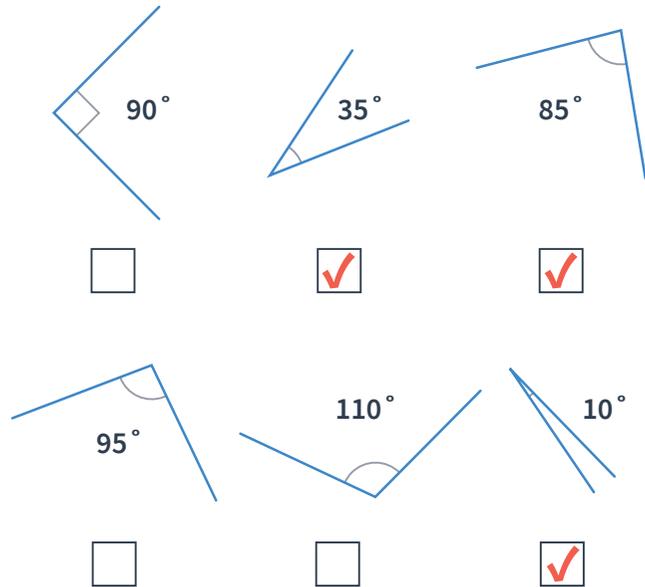
Each bag contains 5 small bouncy balls.

How many small bouncy balls does the toy shop order?

bouncy balls

_____
2 marks

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Q1 Tick all the acute angles.

90° ☐

35° ☑

85° ☑

95° ☐

110° ☐

10° ☑

___
1 mark

Q2 Fill in the missing boxes in this calculation.

```
   5  6  8  8
+     6  3  4
_____
   6  3  2  2
```
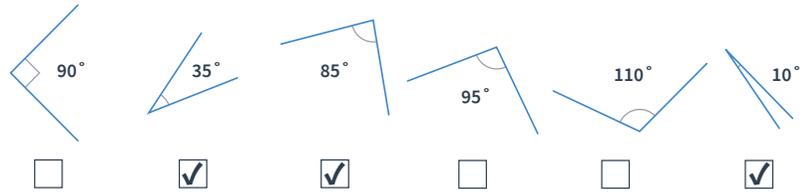
___
2 marks

Q3 A toy shop orders 14 boxes of small bouncy balls.

Each box contains 24 bags of bouncy balls.

Each bag contains 5 small bouncy balls.

How many small bouncy balls does the toy shop order?

1,680 bouncy balls

___
2 marks

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	Requirement	Mark	Additional guidance
Q1	90° 35° 85° 95° 110° 10° ☐ ☑ ☑ ☐ ☐ ☑	1	**Accept other clear indication.**
Q2	5 6 8 8 + 6 3 4 ——————— 6 3 2 2 **Award TWO marks for all four values correctly indicated.** **Award ONE mark for three values correctly identified.**	2	
Q3	**Award TWO marks for the correct answer of 1,680 balls.** **Award ONE mark for a complete method with up to one arithmetic error, e.g.** 24 × 14=336 336 × 5 = wrong answer **OR** 24 × 5 = wrong answer wrong answer × 24 = answer.	2	

What are examiners looking for?

Q3 **A toy shop orders 14 boxes of small bouncy balls.**

Each box contains 24 bags of bouncy balls.

Each bag contains 5 small bouncy balls.

How many small bouncy balls does the toy shop order?

1,680 bouncy balls

2 marks

Why are we asking this question?

This question is designed to assess children's ability to identify and solve multi-step problems, alongside their ability to multiply two-digit numbers by two-digit numbers.

What common errors do we expect to see?

Children give the answers 120 or 336. This indicates that children have misinterpreted the information given in the problem and only carried out a single step from the problem: they have multiplied 24 × 5 or 24 × 14.

Children make an error with the 'long' multiplication required in the question. This indicates that children are not secure with the long multiplication strategies taught in the school, and that these need to be retaught, ensuring they are taught in a way that fosters a true conceptual understanding.

How to encourage children to solve this question

First, encourage children to read through the question, underlining or highlighting the key terms. They should have identified '14 boxes', '24 bags' and 'each bag contains 5 bouncy balls' as the key information from this problem.

Children should then be able to formulate this information into the calculations needed, recording 14 × 24 × 5 or similar.

They should then be encouraged to consider the most efficient way to carry out these calculations, identifying that the calculations may be simpler to carry out if they multiplied 24 by 5 or 14 by 5 first. However, children should also understand that due to the distributive law of multiplication the order that they carry out the calculations in does not impact the final outcome.

Children should then be encouraged to carry out the two multiplication calculations needed to solve this problem.

Q1 Tallulah has drawn a rectangle.

The length of the rectangle is double its height.

The height of the rectangle is 6cm.

What is the area of the Tallulah's rectangle? Don't forget your units!

1 mark

Q2 Here are two numbers:

9,996   10,006

Circle the number closest to ten thousand, then explain how you know.

1 mark

Q3 This **line graph** shows how far Evie cycled in one afternoon.

a By what time had Evie cycled 8km?

	pm

<div align="right">1 mark</div>

b How far did Evie cycle between her first and second breaks?

	km

<div align="right">1 mark</div>

Q1 Tallulah has drawn a rectangle.

The length of the rectangle is double its height.

The height of the rectangle is 6 cm.

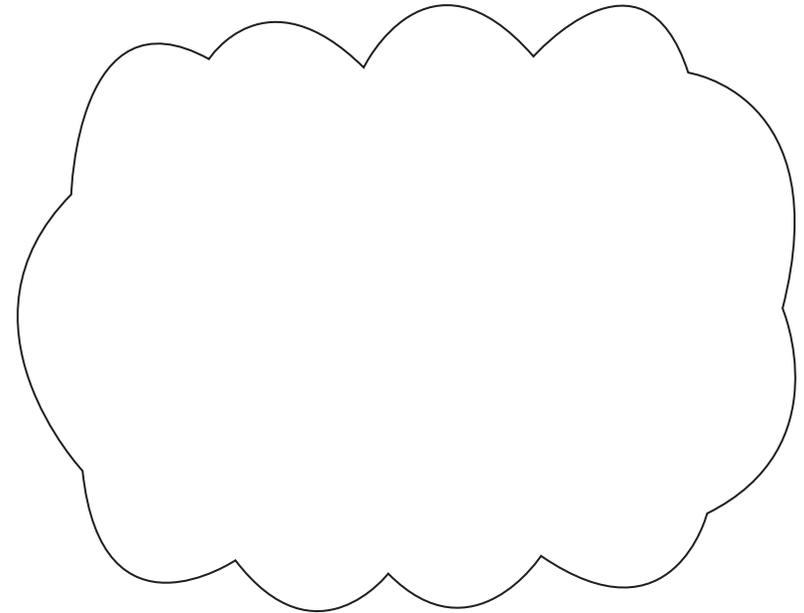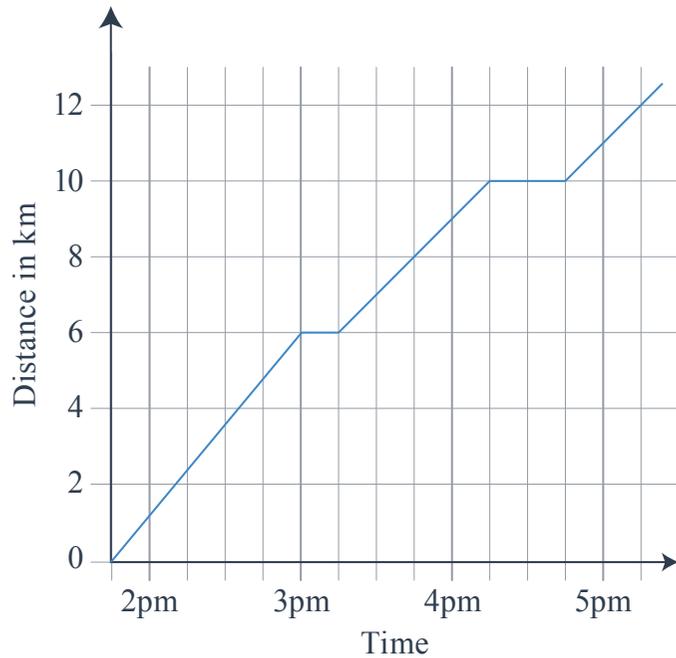What is the area of the Tallulah's rectangle? Don't forget your units!

72cm²

1 mark

Q2 Here are two numbers:

(9,996)   10,006

Circle the number closest to ten thousand, then explain how you know.

See mark scheme for examples

1 mark

Q3 This **line graph** shows how far Evie cycled in one afternoon.

a By what time had Evie cycled 8km?

3.45 pm

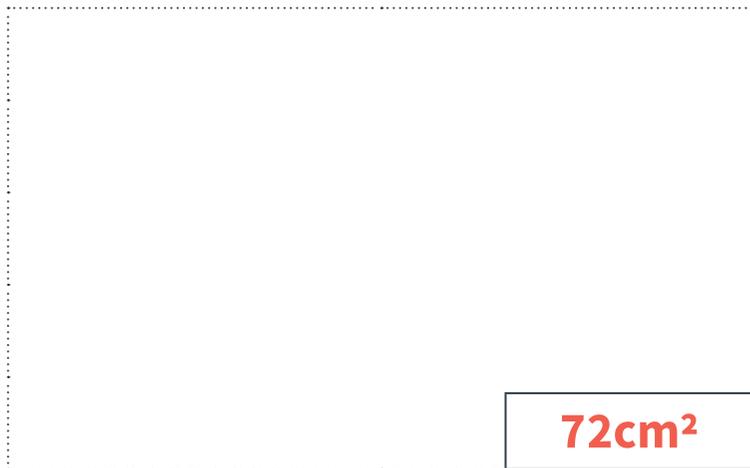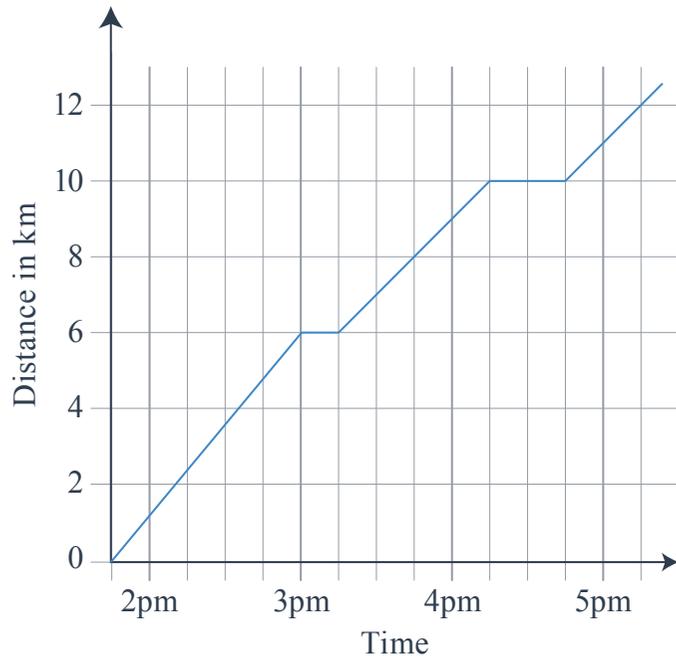1 mark

b How far did Evie cycle between her first and second breaks?

4 km

1 mark

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for the correct answer of 72cm². Award **ONE** mark for either: an answer of 72 or 72cm **OR** a complete method, with no more than one arithmetic error and the correct units, for example: 6 × 2 = 12. 12 × 6 = wrong answer.	1	Correct units must be given for the award of **TWO** marks.
Q2	Award **ONE** mark for **BOTH** the correct identification of 9,996 **AND** an explanation that acknowledges that the difference between 9,996 and 10,000 is 4 whereas the difference between 10,006 and 10,000 is 6.	1	Explanation must be complete. Do **NOT** accept vague explanations, for example, Do **NOT** accept '9,996 is only 4 away from 10,000.' Accept reference to either 10,000, 10 thousand or ten thousand.
Q3a	3.45pm	1	
Q3b	4km	1	

Q1 Finlay is playing a big game of snakes and ladders.

On his board, there are 13 squares in each row and 15 squares in each column.

How many squares are there on the board altogether?

squares

1 mark

Q2 Ava thinks of two prime numbers.

She adds the two numbers together.

Her answer is 24.

Write **all** the possible pairs of prime numbers Ava could be thinking of.

_____

_____

_____

2 marks

Q3 Put a tick in each row to complete this table.

One has been done for you.

	Less than 0.75	Greater than 0.75
0.61	✓	
$\frac{4}{5}$		
$\frac{23}{28}$		
$\frac{1}{2}$		
0.078		

2 marks

Q1 Finlay is playing a big game of snakes and ladders.

On his board, there are 13 squares in each row and 15 squares in each column.

How many squares are there on the board altogether?

195 squares

1 mark

Q2 Ava thinks of two prime numbers.

She adds the two numbers together.

Her answer is 24.

Write **all** the possible pairs of prime numbers Ava could be thinking of.

17,7

19,5

13,11

2 marks

Q3 Put a tick in each row to complete this table.

One has been done for you.

	Less than 0.75	Greater than 0.75
0.61	✓	
$\frac{4}{5}$		✓
$\frac{23}{28}$		✓
$\frac{1}{2}$	✓	
0.078	✓	

2 marks

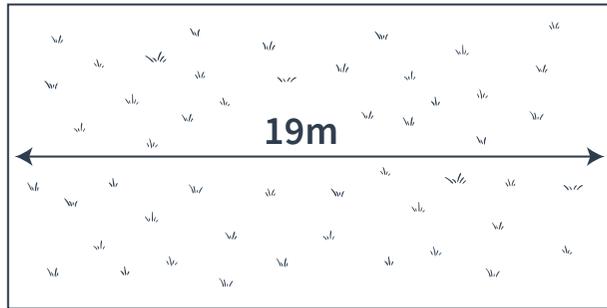|	Requirement	Mark	Additional guidance
Q1	195	1	
Q2	Award **TWO** marks for the correct identification of all three pairs. 17,7 19,5 13,11 Award **ONE** mark for: the correct identification of two pairs, with no incorrect pairs **OR** the correct identification of all three pairs, plus one incorrect pair.	2	Accept the pairs in any order. Numbers must be clearly shown in pairs. Accept 19, 5, 17, 7, 13, 11 as long as numbers in each pair are next to each other.
Q3	<table><tr><td></td><td>Less than 0.75</td><td>Greater than 0.75</td></tr><tr><td>0.61</td><td>✓</td><td></td></tr><tr><td>$\frac{4}{5}$</td><td></td><td>✓</td></tr><tr><td>$\frac{23}{28}$</td><td></td><td>✓</td></tr><tr><td>$\frac{1}{2}$</td><td>✓</td><td></td></tr><tr><td>0.078</td><td>✓</td><td></td></tr></table> Award **TWO** marks for all four ticks correctly placed. Award **ONE** mark for three ticks correctly placed.	2	Accept other clear indication/symbol as long as this is consistent (e.g. accept crosses only if all four rows are completed with crosses).

Q1 The area of a farmer's field is 703m².

The field is rectangular. The width of the field is 19m.

19m

Not to scale

What is the height of the field?

m

2 marks

Q2 Look at this number:

74,903,182.3

a Write down the **digit** that is in the tenths place.

1 mark

b Write down the **digit** that is in the ten thousands place.
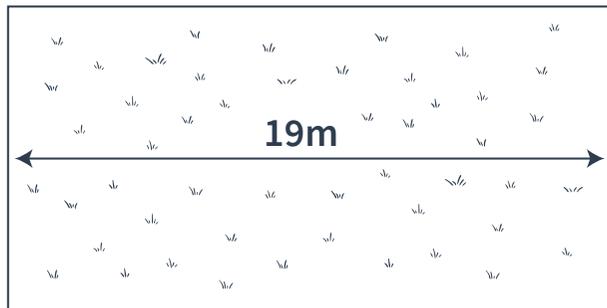
1 mark

Q3 Circle **two** numbers that multiply together to equal 1 million.

200   2,000   5,000   50,000

1 mark

Q1 The area of a farmer's field is 703m².

The field is rectangular. The width of the field is 19m.

19m

Not to scale

What is the height of the field?

37 m

2 marks

Q2 Look at this number:

74,903,182.3

a Write down the **digit** that is in the tenths place.

3

1 mark

b Write down the **digit** that is in the ten thousands place.

0

1 mark

Q3 Circle **two** numbers that multiply together to equal 1 million.

(200)   2,000   (5,000)   50,000

1 mark

	Requirement	Mark	Additional guidance
Q1	37m	2	
Q2b	3	1	
Q2b	0	1	
Q3	200 5,000	1	**BOTH** 200 and 5,000 must be circled for the award of **ONE** mark.

Q1 Kieron and Hope each have some money.

Altogether they have £3.00.

Kieron gives Hope 20p so that they both have the same amount.

How much money did each have at the start?

Kieron had ☐   Hope had ☐

2 marks

Q2 Write in the missing numbers.

72 months = ☐ years

96 hours = ☐ days

720 minutes = ☐ hours

2 marks

Q3 Here are four digit cards.

| 7 | 5 | 2 | 4 |

Use these cards to complete the calculation so that the answer would round to 1,000 when rounded to the nearest hundred.

623 + ☐ ☐ ☐ =

1 mark

Q1 Kieron and Hope each have some money.

Altogether they have £3.00.

Kieron gives Hope 20p so that they both have the same amount.

How much money did each have at the start?

Kieron had **£1.70**   Hope had **£1.30**

2 marks

Q2 Write in the missing numbers.

72 months = **6** years

96 hours = **4** days

720 minutes = **12** hours

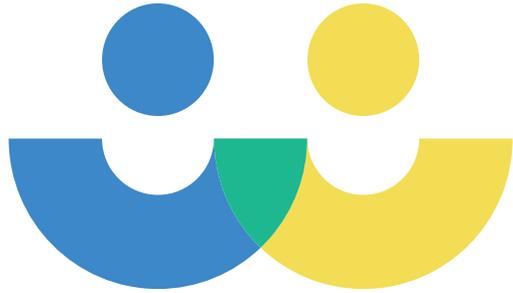2 marks

Q3 Here are four digit cards.

7 **5** **2** **4**

Use these cards to complete the calculation so that the answer would round to 1,000 when rounded to the nearest hundred.

623 + **4** **2** **5** =

1 mark

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for the correct answer: Kieron had **£1.70**. Hope had **£1.30**. If the answer is incorrect, award **ONE** mark for: evidence of appropriate method, e.g. 300 ÷ 2 = 150 (150 + 20) AND (150 – 20) **OR** a 'trial and improvement' method with at least three 'trials' that get increasingly closer to the correct answer **OR** answers that are reversed **OR** answers without correct money notation.	2	Correct money notation must be used for the award of **TWO** marks. Also accept 170 and 1.70 for **TWO** marks here. For the award of **ONE** mark, the method must be complete and feasible and must clearly show that an answer has been arrived at, but this does not need to be recorded in the answer box.
Q2	72 months = **6** years 96 hours = **4** days 720 minutes = **12** hours Award **TWO** marks for all three values completed correctly. Award **ONE** mark for two values completed correctly.	2	
Q3	425	1	Accept .0, .00 or .000 after the whole number answer (e.g. accept 6.00).

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