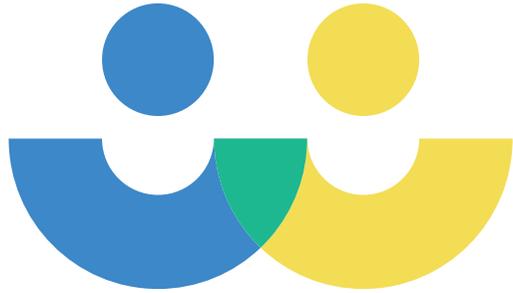# THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 6 | Weeks 1–12

THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 6 | Week 6

This week, the new Year 6 objectives that are introduced continue to focus on **calculations with all four operations**, including **properties of number**.

Year 6 objectives introduced in a reasoning context for the first time this week focus on:

- using knowledge of order of operations to carry out calculations involving all four operations
- identifying and using multiples and factors, including prime numbers and common multiples/factors.

Children continue to be exposed to the following objectives from weeks 4 and 5:

- dividing numbers with up to four digits by a two-digit whole number, including interpreting remainders based on the context of the question.
- performing a range of mental calculations, including with mixed operations and whole numbers
- multiplying numbers with up to four digits by a two-digit whole number
- addition and subtraction questions from the Year 5 curriculum, involving adding and subtracting numbers with more than four digits
- 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 Write all the factors of 30 that are also factors of 45.

_____

_____

1 mark

Q2 Look at these calculations.
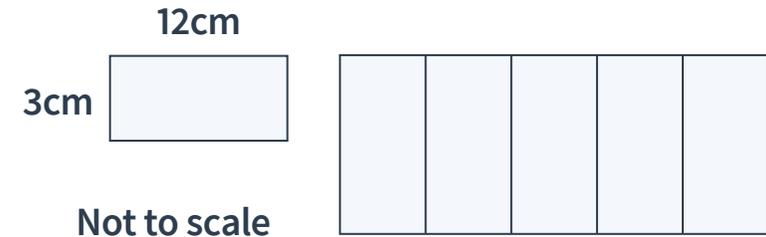
$$1301 + 287 = ?$$

$$1499 + 287 = ?$$

$$1545 + 287 = ?$$

Which calculation is the odd one out? Why?

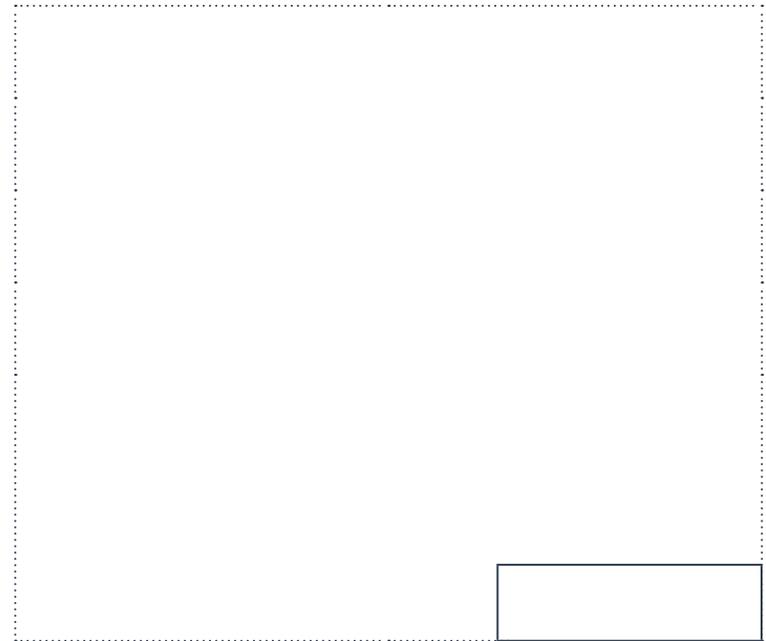_____

_____

_____

2 marks

Q3 A large rectangle is made up of five smaller rectangles.

12cm

3cm

Not to scale

What is the perimeter of the large rectangle?

2 marks

Q1 Write all the factors of 30 that are also factors of 45.

_____ **1, 3, 5, 15** _____

_____

1 mark

Q2 Look at these calculations.

$$1301 + 287 = ?$$

$$1499 + 287 = ?$$

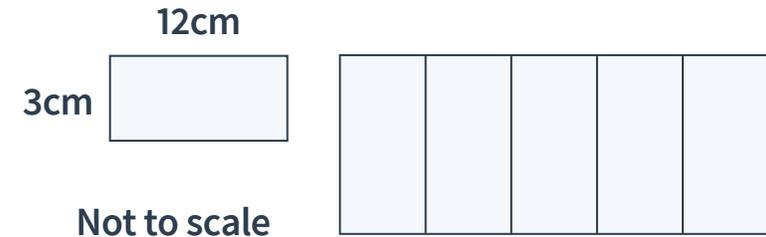$$1545 + 287 = ?$$

Which calculation is the odd one out? Why?

1545 + 287 = ?
_____

See mark scheme for examples
_____

_____

2 marks

Q3 A large rectangle is made up of five smaller rectangles.

12cm

3cm

Not to scale

What is the perimeter of the large rectangle?

54cm

2 marks

	Requirement	Mark	Additional guidance
Q1	**1, 3, 5, 15**	1	**Accept in any order**
Q2	Award **TWO** marks for the answer of 1545 + 287 = ? accompanied by an explanation that refers to the other two calculations being close to a multiple of 100, and therefore they can be carried out mentally. For example: 1545 + 287 = ? is the odd one out, as it is does not contain a near multiple of 100 like the others, and therefore would be more difficult to carry out mentally. 1301 − 1 = 1,300 1499 + 1 = 1,500 The first two calculations contain numbers that are close to multiples of 100. 1545 is not close to a multiple of 100. Award **ONE** mark for the correct identification of 1545 + 287 = ? as the odd one out, but without any explanation, **OR** for any other mathematically feasible explanation explaining why one of the calculations is the odd one out.	2	

	Requirement	Mark	Additional guidance
Q3	Award **TWO** marks for the correct answer of 54cm. Award **ONE** mark for either: 54 or 54m or 54cm² **OR** a full, feasible method, with no more than one arithmetic error, e.g. 3 × 5 = 15 15 × 2 = 30. 30 + 12 + 12 = wrong answer.	2	Correct units must be given for the award of **TWO** marks. For the award of **ONE** mark, the correct side lengths must be used. Do **NOT** accept: 15 × 5= 75 75 × 2 = 150 150 × 3 × 3 = 156

Q1 There are 5,000 leaflets in a box.

Priya delivers 3,420 leaflets.

James delivers 1,380 leaflets.

How many leaflets are left in the box?

leaflets

1 mark

Q2 Put one of the following symbols in each box to make these statements correct.

<   =   >

$5 \times 4 + 2 \div 2$ [ ] **11**

$3 \times (4 + 5)$ [ ] $3 \times 4 + 5$

$20 + 3 \times 4 \div 2$ [ ] $(20 + 3) \times 4 \div 2$

2 marks

Q3 Circle the number closest to 5,000.

5,321   5,201   4,893   6,795   483

1 mark

Q1 There are 5,000 leaflets in a box.

Priya delivers 3,420 leaflets.

James delivers 1,380 leaflets.

How many leaflets are left in the box?

200 leaflets

_____
1 mark

Q2 Put one of the following symbols in each box to make these statements correct.

<   =   >

$5 \times 4 + 2 \div 2$ **>** 11

$3 \times (4 + 5)$ **>** $3 \times 4 + 5$

$20 + 3 \times 4 \div 2$ **<** $(20 + 3) \times 4 \div 2$

_____
2 marks

Q3 Circle the number closest to 5,000.

5,321   5,201   4,893   6,795   483

_____
1 mark

	Requirement	Mark	Additional guidance
Q1	**200**	1	
Q2	**Award TWO marks for all symbols being correct.** **Award ONE mark for two correct symbols.** $5 \times 4 + 2 \div 2 \quad > \quad 11$ $3 \times (4 + 5) \quad > \quad 3 \times 4 + 5$ $20 + 3 \times 4 \div 2 \quad < \quad (20 + 3) \times 4 \div 2$	2	
Q3	**4,893**	1	

What are examiners looking for?

Q2 Put one of the following symbols in each box to make these statements correct.

< = >

$5 \times 4 + 2 \div 2$ **>** 11

$3 \times (4 + 5)$ **>** $3 \times 4 + 5$

$20 + 3 \times 4 \div 2$ **<** $(20 + 3) \times 4 \div 2$

2 marks

Why are we asking this question?

This question is designed to assess children's understanding of the order of operations, together with their understanding of the use of the inequality signs (which is knowledge that was first introduced in Year 2).

What common errors do we expect to see?

Children incorrectly apply the order of operations. This indicates that children do not have a true conceptual understanding of how to apply the order of operations.

Children reverse the inequality symbols. This indicates that children do not understand that < means less than and > means more than. Children should remember that the 'big' end of the symbol always faces the biggest number.

BIG > SMALL
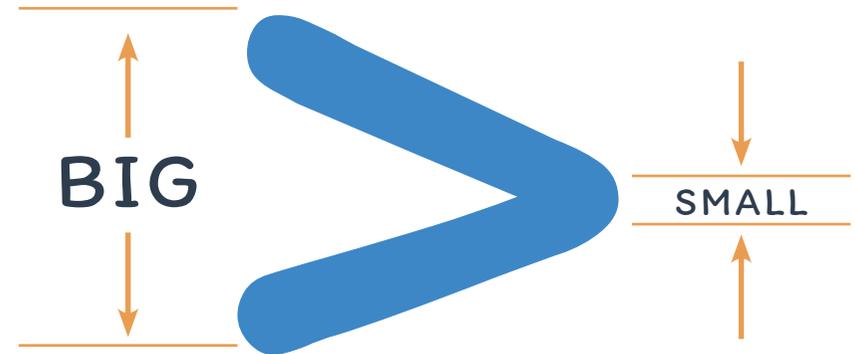
How to encourage children to solve this question

Children should first be encouraged to recall, and if needed, write down, the correct order of operations. When doing so, it is important that they recall that division and multiplication have the same priority as each other, as do addition and subtraction. Therefore, if using the commonly used BODMAS/BIDMAS acronym, it is important that it is recorded as follows, which helps to show this equal priority:

B

O

DM

AS

They should then work out the value of each statement, recording this above or around the question, and then place the correct inequality symbol.

Q1 Wicked Washes car wash processes 54 cars per day.

They charge £13 per car.

How much money will they have made in three days?

2 marks

Q2

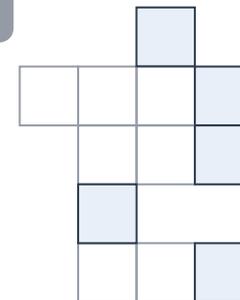**a** Write down all the common multiples of 3 and 4 under 50.

_____

1 mark

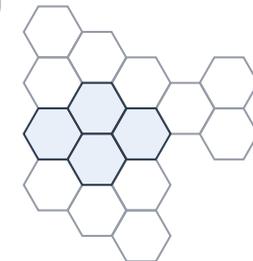**b** Write down all the common factors of 30 and 40 under 50.

_____

1 mark

Q3 Complete these diagrams so that $\frac{2}{3}$ of each diagram is shaded.

a **b**

1 mark

1 mark

Q1 Wicked Washes car wash processes 54 cars per day.

They charge £13 per car.

How much money will they have made in three days?

£2,106

2 marks

Q2

a Write down all the common multiples of 3 and 4 under 50.

12, 24, 36, 48

1 mark

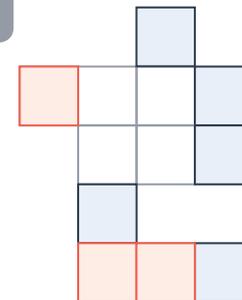**b** Write down all the common factors of 30 and 40 under 50.
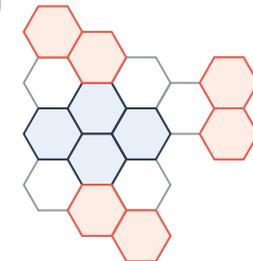
1, 2, 5, 10

1 mark

Q3 Complete these diagrams so that $\frac{2}{3}$ of each diagram is shaded.

a

b

1 mark

1 mark

THIRD SPACE LEARNING

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for the correct answer of £2,106. Award **ONE** mark for 2,106 2,106p or £2,106p **OR** **ONE** mark for a complete method, with no more than one arithmetic error, e.g. 54 × 13 = 702 702 × 3 = wrong answer.	2	Correct money notation must be used for the award of **TWO** marks. Commas are not required.
Q2a	**12, 24, 36, 48**	1	
Q2b	**1, 2, 5, 10**	1	
Q3a	3 **additional** squares shaded	1	
Q3b	6 **additional** hexagons shaded	1	

Q1 Wicked Washes car wash has an extremely busy weekend, and it washes more cars than usual. During the weekend, it takes £1,898.
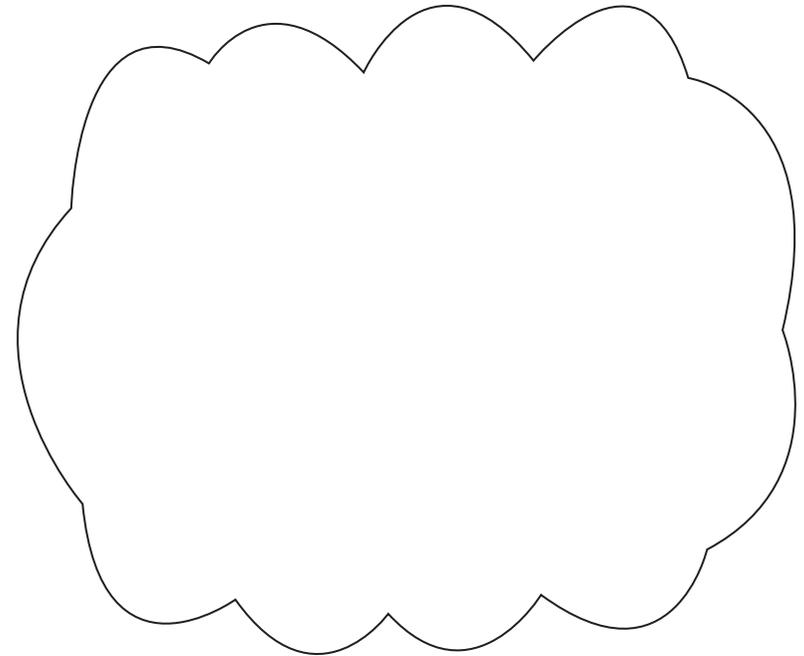
It charges £13 per car.

How many cars did were washed over the weekend?

cars

2 marks

Q2 Mia says, "I can work out 3497 + 676 without using a formal written method."
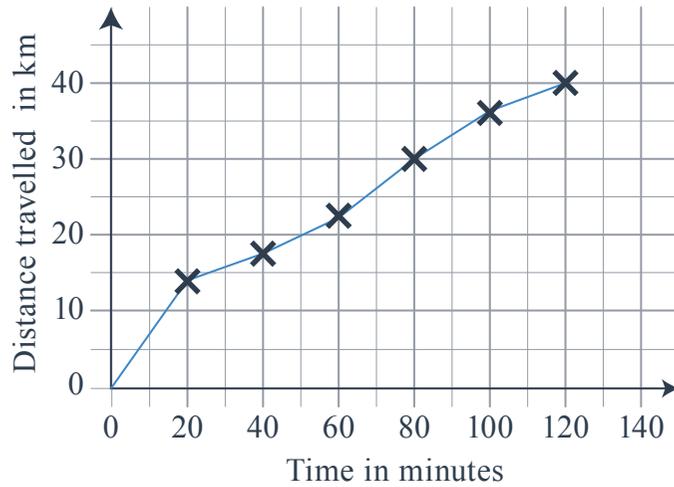
Mia is correct.

Explain why Mia is correct.

1 mark

Q3 Mikey went on a bike ride.

This graph shows how far he travelled at different times.

a How long did it take him to complete the ride?

_____ minutes

_____
1 mark

b After how many minutes had he travelled 30km?

_____ minutes

_____
1 mark

Q1 Wicked Washes car wash has an extremely busy weekend, and it washes more cars than usual. During the weekend, it takes £1,898.

It charges £13 per car.

How many cars did were washed over the weekend?

146 cars

2 marks

Q2 Mia says, "I can work out 3497 + 676 without using a formal written method."

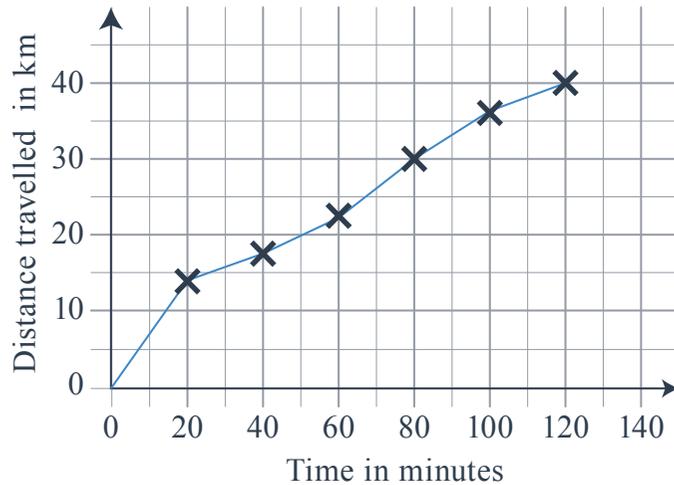Mia is correct.

Explain why Mia is correct.

See mark scheme for examples

1 mark

Q3 Mikey went on a bike ride.

This graph shows how far he travelled at different times.

a How long did it take him to complete the ride?

120 minutes

_____
1 mark

b After how many minutes had he travelled 30km?

80 minutes

_____
1 mark

	Requirement	Mark	Additional guidance
Q1	Accept **TWO** marks for the correct answer of 146. Accept **ONE** mark for evidence of 1898 ÷ 13 being completed using an appropriate long division method, with up to one error.	2	
Q2b	Award **ONE** mark for an explanation that explains that either: 3497 is close to 3500 (or a near multiple of 100) and that therefore you can carry out 3500 + 673 mentally to work out the answer to 3497 + 676 **OR** 3497 is close to 3500 (or a near multiple of 100) and that therefore you can carry out 3500 + 676 mentally and then take away 3 (i.e adjust) your answer to carry out 3497 + 676.	1	
Q3a	**120**	1	
Q3b	**80**	1	

Q1 Sofia chooses a prime number.

She multiplies it by 10 and then rounds it to the nearest hundred.

Her answer is 500.

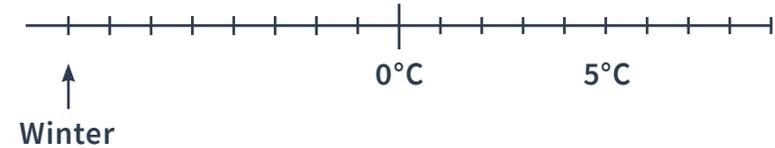> Write all the possible prime numbers Sofia could have chosen.

_____

_____

1 mark

Q2 Tick the correct box to show if each calculation below is correct.

	Correct	Incorrect
4 + 32 × 2 = 22		
8 ÷ 2 × 4 = 1		
3 × 2 + 1 + 10 × 5 = 85		

2 marks

Q3 This temperature scale shows the average temperature in a city.

Winter

a Look at the arrow. What is the average temperature in winter?

°C

1 mark

The average temperature in summer is 23°C **higher** than in winter.

a What is the average temperature in summer?

°C

1 mark

Q1 Sofia chooses a prime number.

She multiplies it by 10 and then rounds it to the nearest hundred.

Her answer is 500.

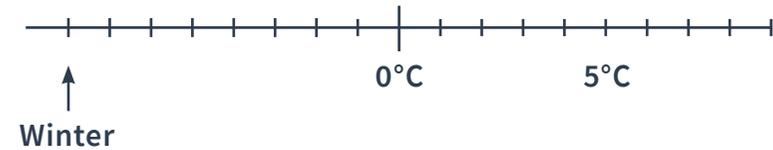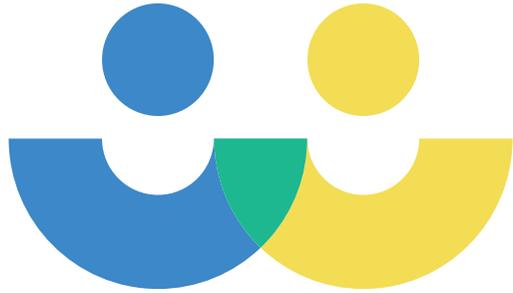Write all the possible prime numbers Sofia could have chosen.

47, 53

1 mark

Q2 Tick the correct box to show if each calculation below is correct.

	Correct	Incorrect
$4 + 32 × 2 = 22$		✓
$8 ÷ 2 × 4 = 1$		✓
$3 × 2 + 1 + 10 × 5 = 85$		✓

2 marks

Q3 This temperature scale shows the average temperature in a city.

0°C   5°C

Winter

a Look at the arrow. What is the average temperature in winter?

−8 °C

1 mark

The average temperature in summer is 23°C **higher** than in winter.

a What is the average temperature in summer?

15 °C

1 mark

	Requirement	Mark	Additional guidance
Q1	47, 53	1	Accept in any order.
Q2	Award **TWO** marks for all three rows correctly completed. Award **ONE** mark for two rows correctly completed.	2	

	Correct	Incorrect
4 + 32 × 2 = 22		✓
8 ÷ 2 × 4 = 1		✓
3 × 2 + 1 + 10 × 5 = 85		✓

	Requirement	Mark	Additional guidance
Q3a	−8	1	Do not accept 8.
Q3b	15	1	Do not accept −15 or 23.

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