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 1

This is the first week that children will have met *Rapid Reasoning* in Year 6 and therefore they may find it more challenging to begin with.

As we are at the start of Year 6, the majority of the objectives covered this week involve Year 5 content. The Year 5 objectives that are re-introduced this week focus on **place value**.

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

- reading, writing, ordering and comparing numbers up to 10,000,000
- rounding numbers to any degree of accuracy.

We hope your class enjoys this first week of *Rapid Reasoning*!

Q1

a Write the number three million, two hundred and forty thousand, four hundred and three in digits.

_____

1 mark

b Write the number 456,802 in words.

_____

_____

_____

_____

_____

1 mark

Q2 Freddie's Fairground has 4,568 visitors on Friday, 10,832 visitors on Saturday and 6,789 visitors on Sunday.

How many visitors did Freddie's Fairground have **altogether** between Friday and Sunday?

1 mark

Q3 Circle the prime numbers below.

1 2 4 15 19 23 242

2 marks

Q1

a Write the number three million, two hundred and forty thousand, four hundred and three in digits.

3,240,403

1 mark

b Write the number 456,802 in words.

Four hundred and fifty six thousand, eight hundred and two.

1 mark

Q2

Freddie's Fairground has 4,568 visitors on Friday, 10,832 visitors on Saturday and 6,789 visitors on Sunday.

How many visitors did Freddie's Fairground have **altogether** between Friday and Sunday?

22,189

1 mark

Q3

Circle the prime numbers below.

1 (2) 4 15 (19) (23) 242

2 marks

	Requirement	Mark	Additional guidance
Q1a	3,240,403	1	Commas are not required for the award of the mark.
Q1b	Four hundred and fifty six thousand, eight hundred and two.	1	Commas, capitalisation and hyphens are not required for the award of the mark. Spellings must be phonetically plausible.
Q2	22,189	1	
Q3	Award **TWO** marks for 2, 19 and 23 circled. Award **ONE** mark for: two correct numbers circled and **NO** incorrect numbers circled three correct numbers circled, with **ONE** additional, incorrect numbers circled.	2	You may wish to remind children that any even number above two is composite (i.e. non prime).

Q1

× 10	× 100	÷ 10	÷ 100	÷ 1000

Choose from the cards above to complete the calculations. You won't need to use them all.

4,594 ☐ = 45.94

33,832 ☐ = 338,320

54.3 ☐ = 5,430

432.4 ☐ = 43.24

2 marks

Q2

a Round 4,594 to the nearest 10.

1 mark

Q2

b Round 496,843 to the nearest ten thousand.

1 mark

Q3

Day	Visitors to Art Museum	Visitors to Science Museum
Monday	4,594	4,503
Tuesday	8,832	6,842
Wednesday	3,043	9,832

a On which day(s) did the Art Museum have more visitors than the Science Museum?

1 mark

b Which museum had the most visitors altogether between Monday and Wednesday?

1 mark

Q1

× 10 | × 100 | ÷ 10 | ÷ 100 | ÷ 1000

Choose from the cards above to complete the calculations. You won't need to use them all.

4,594 ÷ 100 = 45.94

33,832 × 10 = 338,320

54.3 × 100 = 5,430

432.4 ÷ 10 = 43.24

2 marks

Q2

a Round 4,594 to the nearest 10.

4,590

1 mark

Q2

b Round 496,843 to the nearest ten thousand.

500,000

1 mark

Q3

Day	Visitors to Art Museum	Visitors to Science Museum
Monday	4,594	4,503
Tuesday	8,832	6,842
Wednesday	3,043	9,832

a On which day(s) did the Art Museum have more visitors than the Science Museum?

Monday AND Tuesday

1 mark

b Which museum had the most visitors altogether between Monday and Wednesday?

Science Museum

1 mark

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for correctly completing all boxes. 4,594 [÷ 100] = 45.94 33,832 [× 10] = 338,320 54.3 [× 100] = 5,430 432.4 [÷ 10] = 43.24 Award **ONE** mark for the correct completion of THREE boxes.	2	
Q2a	4,590	1	Commas are **not** required to be present in answers for the award of marks.
Q2b	500,000	1	
Q3a	Monday AND Tuesday	1	**BOTH** must be recorded for **ONE** mark.
Q3b	Science Museum	1	Accept any unambiguous indication (i.e. Science).

Q1 Complete these number sentences so that they are correct.

$6{,}843 \times 100 =$ ☐

$6{,}943 \div 1{,}000 =$ ☐

2 marks

Q2 Evie has these digit cards:

4	5	0	8	2	3

She makes them into a six-digit number.

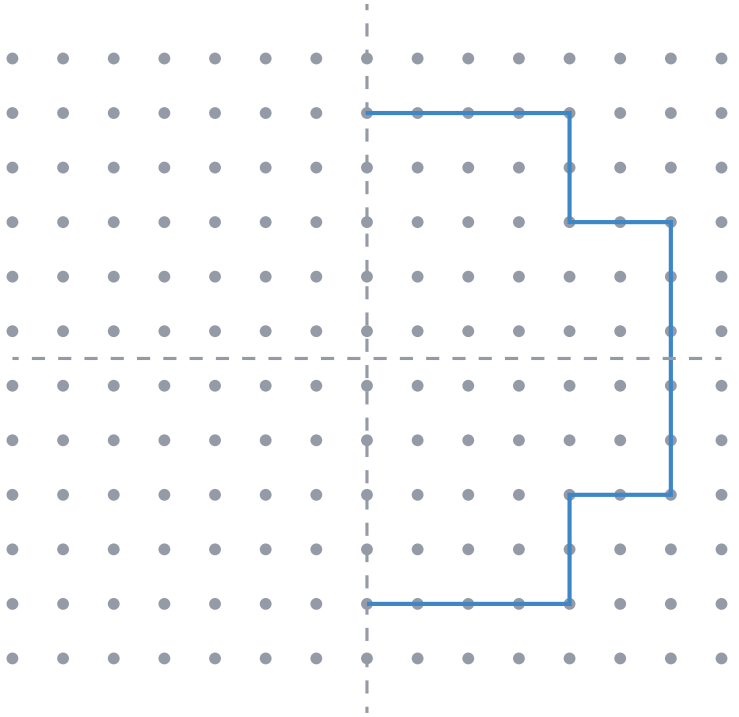
- It is larger than 300,000 but smaller than 400,000.
- It has four tens but no thousands.
- It has twice as many ten thousands and tens.
- The digit in the ones place is smaller than the digit in the tens place.

What number has Evie been thinking of?

☐ ☐ ☐ ☐ ☐ ☐

2 marks

Q3 Complete the drawing so that it has ONE lines of symmetry.



1 mark

Q1 Complete these number sentences so that they are correct.

$6{,}843 \times 100 =$ **684,300**

$6{,}943 \div 1{,}000 =$ **6.943**

2 marks

Q2 Evie has these digit cards:

4	5	0	8	2	3

She makes them into a six-digit number.

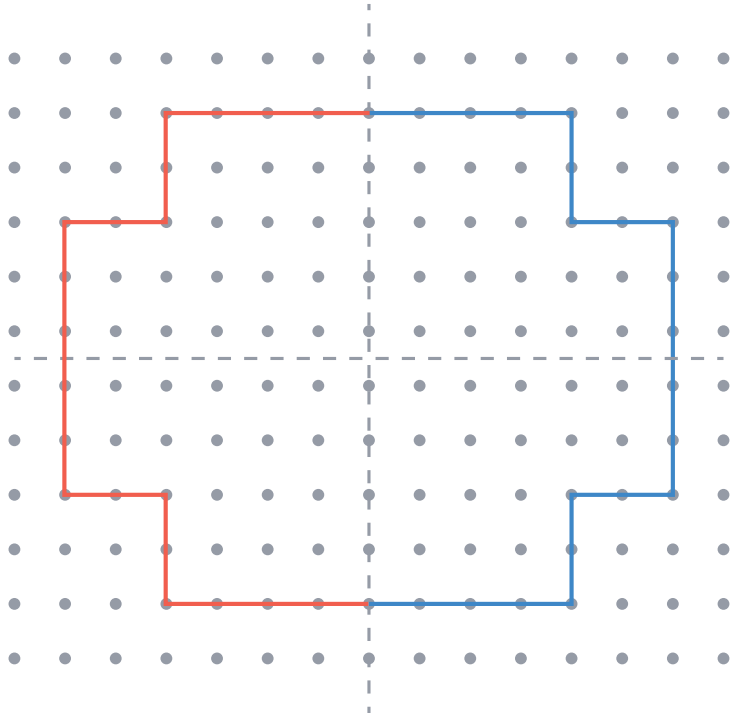
- It is larger than 300,000 but smaller than 400,000.
- It has four tens but no thousands.
- It has twice as many ten thousands and tens.
- The digit in the ones place is smaller than the digit in the tens place.

What number has Evie been thinking of?

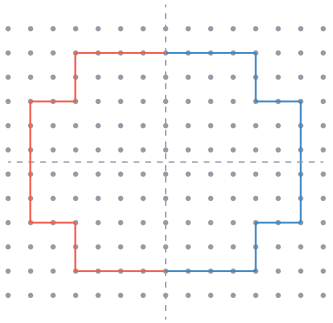
3	8	0	5	4	2

2 marks

Q3 Complete the drawing so that it has ONE lines of symmetry.



1 mark

	Requirement	Mark	Additional guidance
Q1	Award **ONE** mark for **EACH** correctly completed calculation. 6,843 × 100 = 684,300 6,943 ÷ 1,000 = 6.943	2	Commas are not required for the award of the marks. Ensure decimal points are clear.
Q2	Award **TWO** marks for all six digits correctly placed. 3 8 0 5 4 2 Award **ONE** mark for four or more digits correctly placed.	2	Do **NOT** award any marks if: • digits are duplicated OR • digits are used that were not provided in the question.
Q3		1	Accept slight deviance from marked points. It is worth noting that in SATs papers, any points more than 2mm out may lead to the mark not being awarded.

What are examiners looking for?

Q1 Complete these number sentences so that they are correct.

$6{,}843 \times 100 =$ **684,300**

$6{,}943 \div 1{,}000 =$ **6.943**

2 marks

Why are we asking this question?

This question is designed to test children's ability to multiply and divide by 10, 100 and 1,000. Specifically, we are looking to see if children can identify and apply any generalisations they may have made about dividing and multiplying by 10, 100 and 1,000 (i.e. to divide by 1,000 you move the digits three places to the right).

What common errors do we expect to see?

Children can confuse the generalisations/rules they have learnt. For example, dividing by 1,000 by moving the digits to the left rather than right (giving the answer 694, 300) or by moving only two places to the right when dividing by 1,000 (giving the answer 69.43). These common errors mean it is really important that children have a true conceptual understanding of any generalisations they make, rather than these simply being 'taught' and 'memorised' as this often leads to children misremembering or misapplying such generalisations/rules.

Children can incorrectly think that to divide by 1,000 they remove 3 digits. They would therefore give the answer of 6. If children are first exposed to dividing by 10, 100 or 1,000 by dividing multiples of 10/100/1,000 then they often incorrectly generalise that to divide by 10/100/1,000 they remove 0s and then incorrectly think they just remove a certain number of digits.

How to encourage children to solve this question

When dividing or multiplying by 10, 100 or 1,000, children should be encouraged to draw their own place value grid, like the one shown below.

HTh	TTh	Th	H	T	O	.	t	h	th
		6	9	4	3	.			

They can then use this to help them solve the questions, knowing the generalisations that they have made themselves through your teaching about the direction and number of places that the digits move in.

"To divide by 1,000 I move the digits three places to the right."

HTh	TTh	Th	H	T	O	.	t	h	th
		6	9	4	3	.			
					6	.	9	5	4

It is important that children remember that the decimal place does not move, and that 0 is a place holder, and therefore fills any 'gaps' in the number.

Remember, when teaching multiplying and dividing by 10, 100 and 1,000 it is important that children experience this conceptually, using a mixture of place value grids as well as place value manipulatives, so that they can see and understand why the digits move in the ways they do.

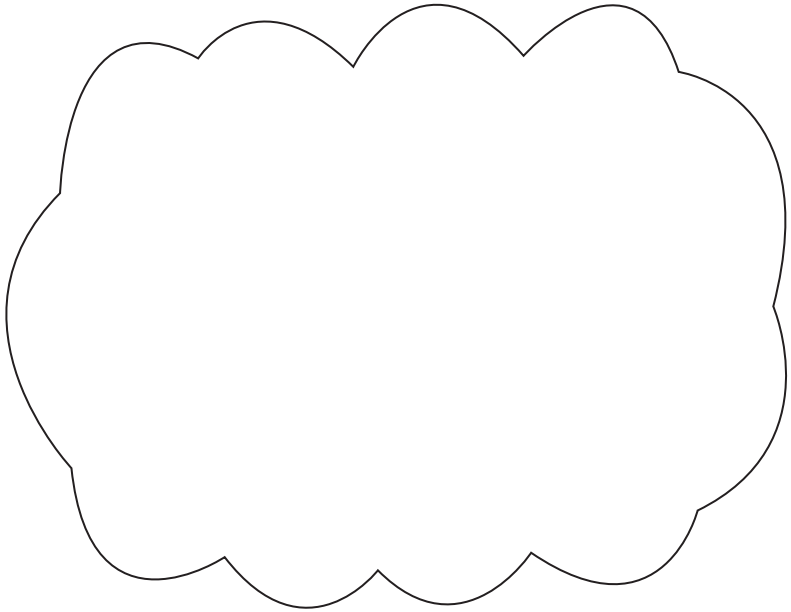
Q1 Draw lines between the fractions that are **equivalent.**

$\frac{3}{4}$	$\frac{12}{80}$
$\frac{6}{16}$	$\frac{12}{32}$
$\frac{5}{8}$	$\frac{10}{24}$
$\frac{5}{12}$	$\frac{27}{36}$
$\frac{3}{20}$	$\frac{15}{24}$

2 marks

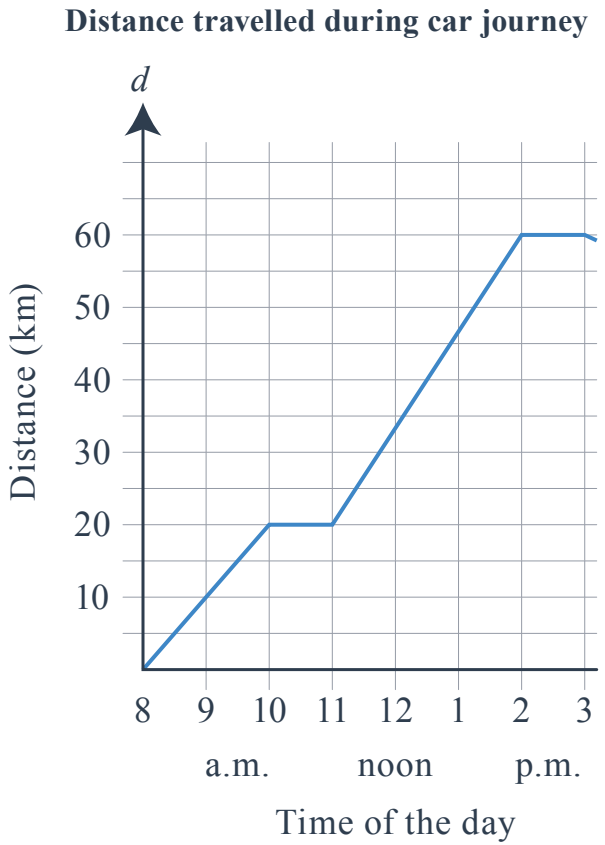
Q2 Marley says, "8,849,842 rounded to the nearest thousand is 8,849,000."

Explain why Marley is incorrect.



1 mark

Q3



a How far had the car travelled by 1pm?

_____ km

1 mark

b The car doesn't move during two periods of the day.

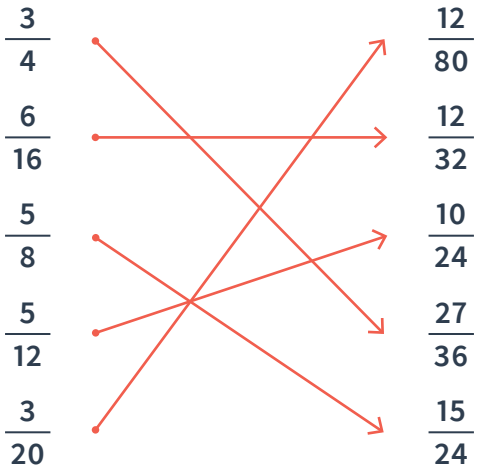
Between which two periods of time does the car not move?

_____ to _____

_____ to _____

1 mark

Q1 Draw lines between the fractions that are **equivalent.**



2 marks

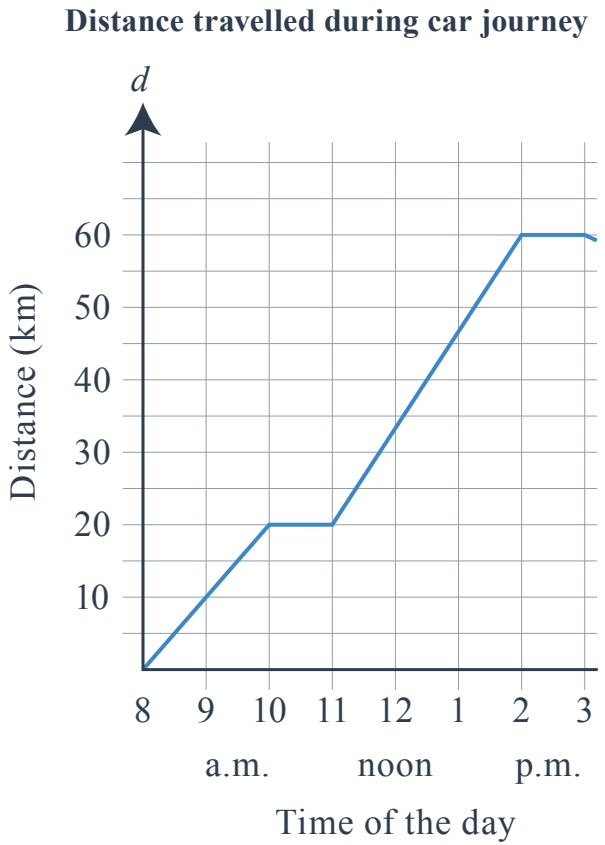
Q2 Marley says, "8,849,842 rounded to the nearest thousand is 8,849,000."

Explain why Marley is incorrect.

See mark scheme for examples

1 mark

Q3



a How far had the car travelled by 1pm?

45 km

1 mark

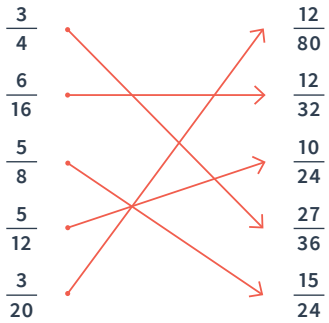
b The car doesn't move during two periods of the day.

Between which two periods of time does the car not move?

10am to 11am

2pm to 3pm

1 mark

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for all five lines correctly drawn as shown below.  Award **ONE** mark for three correctly matched pairs of fractions.	2	
Q2	Correctly identified that: **BOTH** the hundreds place has the digit 9 in it, and this means that the number needs to be rounded up **AND** as the thousands place has a digit 9 in it, rounding up the thousands place requires the value of the ten thousands place to change (ie. from 4 to 5)	1	Example answer: There is a 9 in the hundreds place that means we need to round the number up. Because the thousands place has a digit 9 in it, it also means we need to change the value of the ten thousands place.
Q3a	45km	1	
Q3b	**10am to 11am** **2pm to 3pm**	1	**BOTH** must be correct for the award of **ONE** mark.

Q1 Josh has drawn a square. Each side is 7.5cm.

What is the perimeter of the square?

_____ cm

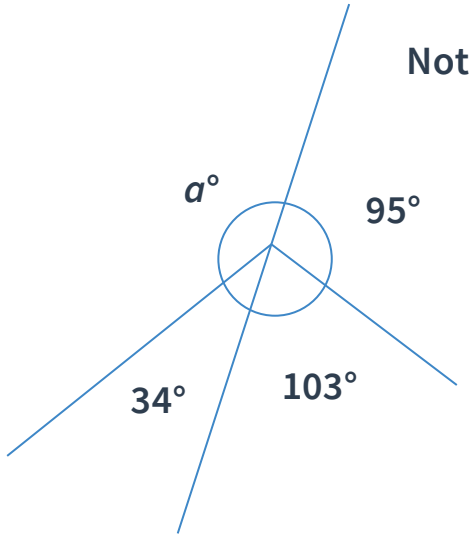
1 mark

Q2 Complete the table below.

	Rounded to the nearest ten	Rounded to the nearest thousand
496,609		
4,768,499		
895		

2 marks

Q3



What is the value of angle *a*?

Angle *a* = _____ °

1 mark

Q1 Josh has drawn a square. Each side is 7.5cm.

What is the perimeter of the square?

30 cm

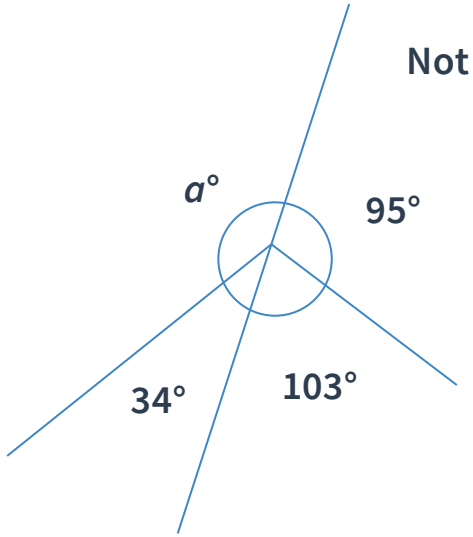
1 mark

Q2 Complete the table below.

	Rounded to the nearest ten	Rounded to the nearest thousand
496,609	496,610	497,000
4,768,499	4,768,500	4,768,000
895	900	1,000

2 marks

Q3



What is the value of angle *a*?

Angle *a* = 128 °

1 mark

<table>
<tr><th></th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>Q1</td><td>30cm</td><td>1</td><td></td></tr>
<tr><td>Q2</td><td>Award TWO marks for a correctly completed table, as shown below:
<table><tr><th></th><th>Rounded to the nearest ten</th><th>Rounded to the nearest thousand</th></tr><tr><td>496,609</td><td>496,610</td><td>497,000</td></tr><tr><td>4,768,499</td><td>4,768,500</td><td>4,768,000</td></tr><tr><td>895</td><td>900</td><td>1,000</td></tr></table>Award ONE mark for FOUR or more correctly completed cells.</td><td>2</td><td>Commas are NOT required to be present in answers for the award of marks.</td></tr>
<tr><td>Q3</td><td>128°</td><td>1</td><td></td></tr>
</table>

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