THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 6 | Week 2

As this is still towards the start of the introduction of Year 6 *Rapid Reasoning*, children should be continuing to increase in their reasoning confidence each day.

The Year 6 objectives introduced this week continue to focus on **place value**. As with all weeks of *Rapid Reasoning*, there continues to be content covered from across the maths curriculum.

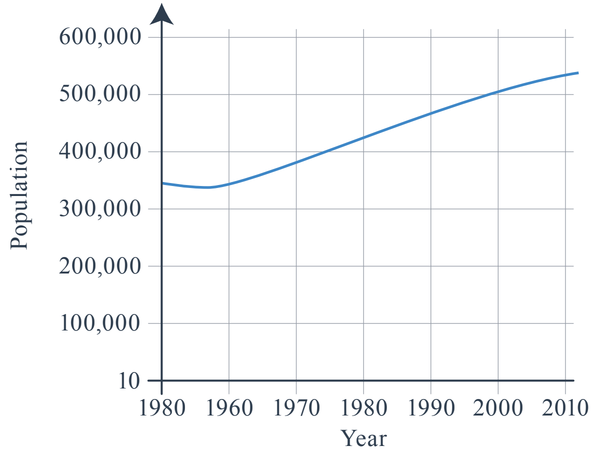
Year 6 objectives introduced in a reasoning context for the first time this week include:

- using negative numbers in context, including calculating intervals across zero
- recognising the place value of each digit in a number up to 10,000,000.

The following Year 6 objectives continue to be a focus from week 1:

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

Q1 Look at this line graph. It shows the population of a town in Norfolk.



a In which year did the population reach 450,000 for the first time?

1 mark

b By how much did the population increase in the 40 years **before** the year 2000?

1 mark

Q2 Round 94,516

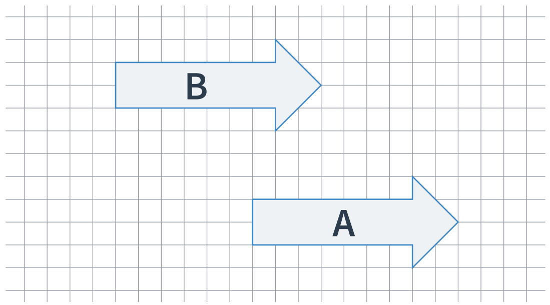
to the nearest 10:

to the nearest 100:

to the nearest 1,000:

2 marks

Q3 These two arrows are identical.

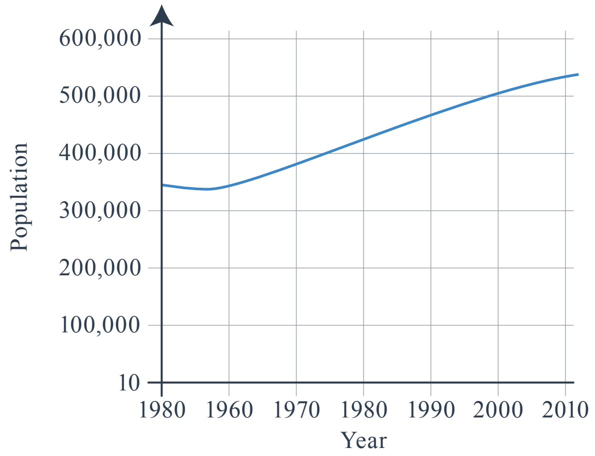


Complete the boxes to describe the **translation** of arrow A to arrow B.

The arrow has moved [ ] squares up and [ ] squares to the left.

1 mark

Q1 Look at this line graph. It shows the population of a town in Norfolk.



a In which year did the population reach 450,000 for the first time?

1985

1 mark

b By how much did the population increase in the 40 years **before** the year 2000?

150,000

1 mark

Q2 Round 94,516

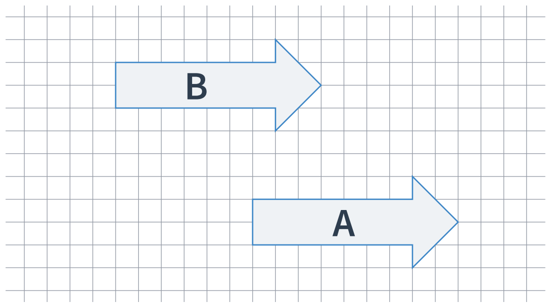
to the nearest 10: 94,520

to the nearest 100: 94,500

to the nearest 1,000: 95,000

2 marks

Q3 These two arrows are identical.



Complete the boxes to describe the **translation** of arrow A to arrow B.

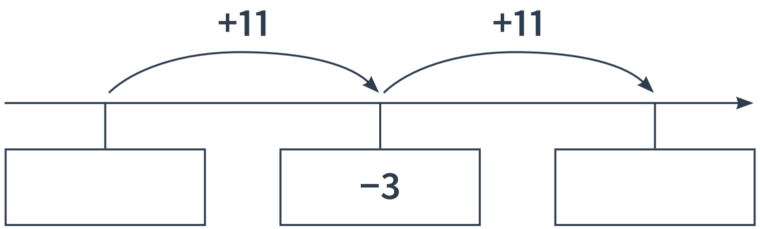
The arrow has moved 6 squares up and 6 squares to the left.

1 mark

	Requirement	Mark	Additional guidance
Q1a	1984 OR 1985 OR 1986	1	
Q1b	Answer in the range 140,000–170,000 **inclusive.**	1	Answers must be a whole number.
Q2	Award **TWO** marks for all three boxes correctly completed, as below: To the nearest 10: **94,520** To the nearest 100: **94,500** To the nearest 1,000: **95,000** Award **ONE** mark for two out of three boxes correctly completed.	2	
Q3	The arrow has moved **six** squares up and **six** squares to the left.	1	**BOTH** must be correct for the award of **ONE** mark.

Q1 Here is part of a number line.

Write the missing numbers in the boxes.



2 marks

Q2 Ali puts these five numbers on a number line.

567,843 453,999 1,033,321 940,999 587,743

a Which number would be closest to 500,000?

1 mark

b Which number would be closest to one million?

1 mark

Q3 Circle the fractions below that are **not** equivalent to $\frac{6}{7}$.

$\frac{18}{21}$ $\frac{22}{28}$ $\frac{60}{70}$ $\frac{42}{35}$ $\frac{7}{14}$ $\frac{72}{84}$

2 marks

Q1 Here is part of a number line.

Write the missing numbers in the boxes.

+ 11 + 11

−14	−3	8

2 marks

Q2 Ali puts these five numbers on a number line.

567,843 453,999 1,033,321 940,999 587,743

a Which number would be closest to 500,000?

453,999

1 mark

b Which number would be closest to one million?

1,033,321

1 mark

Q3 Circle the fractions below that are **not** equivalent to $\frac{6}{7}$.

$\frac{18}{21}$ $\frac{22}{28}$ $\frac{60}{70}$ $\frac{42}{35}$ $\frac{7}{14}$ $\frac{72}{84}$

2 marks

	Requirement	Mark	Additional guidance
Q1	Award **TWO** marks for both numbers correctly placed: −14 and 8. Award **ONE** mark for one number correctly placed.	2	Numbers must be in the correct box to be creditworthy. Do not accept 8, −3 or −14.
Q2a	453,999	1	
Q2b	1,033,321	1	
Q3a	Award **TWO** marks for $\frac{22}{28}$ AND $\frac{42}{35}$ AND $\frac{7}{14}$ correctly circled. Award **ONE** mark for either: two correctly circled and none incorrectly circled **OR** three correctly circled and one incorrectly circled.	2	Do **NOT** award marks for two correctly circled if they are circled along with any incorrectly circled fraction.

Q1 This is a weather report from the radio:

"The temperature in Dundee will average 3°C. The temperature in Glasgow will be 5°C lower than Dundee. The temperature in London will be 8°C higher than Glasgow."

a What will the temperature be in Glasgow today?

1 mark

b What will the temperature be in London today?

1 mark

Q2 Gracie and Evie each start with the same number.

Gracie rounds the number to the nearest hundred.

Evie rounds the number to the nearest ten.

Gracie's answer is double Evie's answer.

Explain how this could be.

1 mark

Q3 Class 6 gets through $\frac{3}{4}$ of a packet of glue sticks per table each year.

There are six tables in the class.

How many boxes of glue sticks does the class get through altogether?

Give your answer as a mixed number.

$\square \frac{\square}{\square}$

1 mark

Q1 This is a weather report from the radio:

"The temperature in Dundee will average 3°C. The temperature in Glasgow will be 5°C lower than Dundee. The temperature in London will be 8°C higher than Glasgow."

a What will the temperature be in Glasgow today?

–2°C

1 mark

b What will the temperature be in London today?

6°C

1 mark

Q2 Gracie and Evie each start with the same number.

Gracie rounds the number to the nearest hundred.

Evie rounds the number to the nearest ten.

Gracie's answer is double Evie's answer.

Explain how this could be.

See mark scheme for examples

1 mark

Q3 Class 6 gets through $\frac{3}{4}$ of a packet of glue sticks per table each year.

There are six tables in the class.

How many boxes of glue sticks does the class get through altogether?

Give your answer as a mixed number.

$\boxed{4}\ \frac{\boxed{1}}{\boxed{2}}$

1 mark

	Requirement	Mark	Additional guidance
Q1a	–2°C	1	Must include units for the award of the mark.
Q1b	6°C	1	Must include units for the award of the mark. If part a) is incorrect, also accept the answer to part a + 8.
Q2	Accept any explanation that includes an example pair of numbers for which this would be true. For example **ACCEPT:** 53 to the nearest hundred is 100, and to the nearest ten is 50 and 2 × 50 = 100. If it's 50 or more but less than 55 it will round to 100 (nearest hundred) and 50 (nearest ten) and 100 is double 50. 51 rounds to 50 and 100.	1	Do **NOT** accept incomplete or vague explanations, for example do **NOT** accept: They use 52. 50 × 2 = 100. They could use between 50 and 55 which round to 100.
Q3	Award **ONE** mark for the correct answer of: $4\frac{1}{2}$ or $4\frac{2}{4}$ (or any equivalent).	1	Do **NOT** award any marks for a whole number followed by an improper fraction, e.g. do not award marks for $3\frac{6}{4}$.

Q1 This table shows the height of the four tallest mountains in Europe.

Mountain name	Height in feet
Mount Elbrus	18,510
Mount Shkhara	17,064
Mont Blanc	15,774
Monte Rosa	15,203

How much higher are Mount Elbrus and Mount Shkhara **combined** than Mount Blanc and Mount Rosa **combined**?

feet

2 marks

Q2 Complete this table.

Number	Rounded to the nearest **thousand**
5,843	
874,732	
699,847	
43,743,743	

2 marks

Q3 Draw lines to match the equivalent proportions.

$\frac{1}{2}$	25%
$\frac{1}{4}$	0.5
$\frac{1}{5}$	80%
$\frac{2}{5}$	20%
$\frac{4}{5}$	0.4

2 marks

Q1 This table shows the height of the four tallest mountains in Europe.

Mountain name	Height in feet
Mount Elbrus	18,510
Mount Shkhara	17,064
Mont Blanc	15,774
Monte Rosa	15,203

How much higher are Mount Elbrus and Mount Shkhara **combined** than Mount Blanc and Mount Rosa **combined**?

4,597 feet

2 marks

Q2 Complete this table.

Number	Rounded to the nearest **thousand**
5,843	6,000
874,732	875,000
699,847	700,000
43,743,743	43,744,000

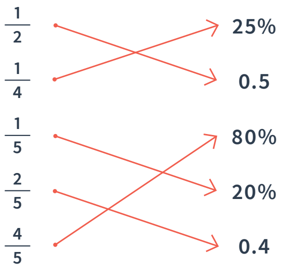
2 marks

Q3 Draw lines to match the equivalent proportions.

$\frac{1}{2}$	25%
$\frac{1}{4}$	0.5
$\frac{1}{5}$	80%
$\frac{2}{5}$	20%
$\frac{4}{5}$	0.4

2 marks

<table>
<tr><th></th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>Q1</td><td>Award TWO marks for the correct answer of 4,597.

Award ONE mark for correct and complete working, which includes no more than two arithmetic errors. Working must include 18,510 + 17,064, 15,774 + 15,203 and then finding the difference between the two totals.</td><td>2</td><td>An answer must be arrived at (but does not need to be in the answer box) for the award of ONE mark.</td></tr>
<tr><td>Q2</td><td>Award TWO marks if all boxes completed correctly:
<table>
<tr><th>Number</th><th>Rounded to the nearest thousand</th></tr>
<tr><td>5,843</td><td>6,000</td></tr>
<tr><td>874,732</td><td>875,000</td></tr>
<tr><td>699,847</td><td>700,000</td></tr>
<tr><td>43,743,743</td><td>43,744,000</td></tr>
</table>
Award ONE mark for three correct answers.</td><td>2</td><td>Commas not needed in answers for the award of marks.</td></tr>
<tr><td>Q3</td><td>Award TWO marks for all correctly matched:


Award ONE mark for three correctly matched.</td><td>2</td><td>Do NOT accept any double matching (i.e. do NOT accept $\frac{1}{4}$ and $\frac{1}{5}$ both joined to 20%).</td></tr>
</table>

Q1 Vicky writes down three numbers:

506,606 650,660 566,600

Write down two things that are the same about these numbers and two things that are different.

Same:

Different:

1 mark

Q2 The difference between two whole numbers is four.

When each number is rounded to the nearest hundred, the difference between them is 100.

Write two possible values for the sets of numbers.

	and	
	and	

2 marks

Q3 Marley says "$\frac{3}{4}$ and $\frac{21}{28}$ are equivalent."

Explain why Marley is correct.

1 mark

Q1 Vicky writes down three numbers:

506,606   650,660   566,600

Write down two things that are the same about these numbers and two things that are different.

Same:

All numbers have six digits.

Different:

The value of each number is different.

1 mark

Q2 The difference between two whole numbers is four.

When each number is rounded to the nearest hundred, the difference between them is 100.

Write two possible values for the sets of numbers.

48	and	**52**
46	and	**50**

2 marks

Q3 Marley says "$\frac{3}{4}$ and $\frac{21}{28}$ are equivalent."

Explain why Marley is correct.

See mark scheme for examples

1 mark

	Requirement	Mark	Additional guidance
Q1	Accept any reasonable, accurate response. Most responses will refer to place value. Examples of correct responses are shown below: **Same:** All numbers have six digits. All numbers have a 6 in the hundreds place (worth 600). All the numbers are bigger than 500,000. All the numbers use the same digits. **Different:** The place value of the digits is different. The value of each number is different. Any place value-related observation e.g. 506,606 has a six in the ones column (worth 6) but the other two numbers don't.	1	When answering this question as a class, why not see how many different 'same' and 'different' facts you can come up with?

	Requirement	Mark	Additional guidance
Q2	Award **TWO** marks for any two pairs of correct numbers from the list below. 46 AND 50 47 AND 51 48 AND 52 49 AND 53 Award **ONE** mark for one pair of correct numbers, plus either no other pair given or one incorrect pair.	2	Accept duplication of the same pair for **ONE** mark.
Q3	Award **ONE** mark for an explanation that explains that they are equivalent as the numerator and denominator are linked by the same scale factor AND that identifies the scale factor. e.g. $3 \times 7 = 21 \quad 4 \times 7 = 28$ You can multiply 3 and 4 by 7 to get to $\frac{21}{28}$.	1	Do **NOT** accept vague answers or answers which do not identify the scale factor.

What are examiners looking for?

Q2 **The difference between two whole numbers is four.**

When each number is rounded to the nearest hundred, the difference between them is 100.

Write two possible values for the sets of numbers.

48	and	52
46	and	50

2 marks

Why are we asking this question?

This question assesses children's true understanding of rounding numbers.

What common errors do we expect to see?

Children consider that the problem is impossible to solve. This indicates that children do not have a secure understanding of rounding, and the impact that this has on the numbers that are being rounded. Children may not understand that numbers that are above 50 would be rounded up, whereas numbers below 50 would be rounded down.

Children record 100 and 200 (or two other rounded numbers) as their answers. This indicates that children have not carefully read the problem and have instead focused solely on the information in the shaded lozenge. Whilst the lozenge provides the key instruction, it should always be read in conjunction with information that has been provided elsewhere in the problem.

How to encourage children to solve this question

First, encourage children to consider the rules they know for rounding, and specifically how these apply to rounding numbers to the nearest 100. Children should recall that they need to look at the place value that is one smaller than the number being rounded to (i.e. look at the **tens** if we are rounding to the nearest **hundred**) to consider if the number is rounded up or down. They should also recall that when rounding to the nearest hundred, if the value of the tens place is 50 **or more** they round up, where if it is **less than** 50 they round the number down.

This should allow the children to begin to 'zone in' on the solution to the problem, and that the problem must rely on one number being rounded down, whilst the other is rounded up. Children should then be encouraged to begin to find solutions through trial and improvement, for example, starting with one number being **150** and the other is therefore **146** and so on.

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and curriculum resources

Rapid Reasoning

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

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- Plug any gaps or misconceptions
- Boost confidence

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