THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 6 | Weeks 13-18

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Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 6 | Week 15

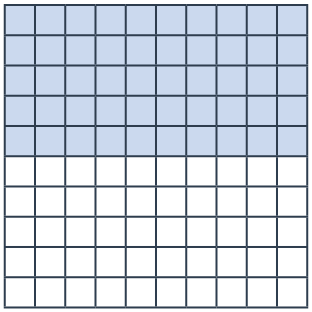
This week, the questions within *Rapid Reasoning* continue to focus on proportionality, including fractions, decimals and percentages.

This week, children will be expected to recall and use equivalences between simple fractions, decimals and percentages, including in different contexts, for the first time.

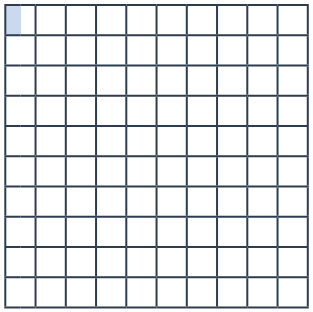
As with previous weeks, other content from Year 6 that the children have met in previous weeks of *Rapid Reasoning*, along with objectives from previous years, will also feature this week.

Q1 Ryan and Simran have both attempted to represent half a percent using a hundred square.

Ryan



Simran



Who has coloured half a percent correctly?
RYAN / SIMRAN Explain your answer.

1 mark

Q2 Draw a pair of brackets in **ONE** of these calculations so that they make two different answers. What are the answers?

$50 - 10 \times 5 =$ ☐

$50 - 10 \times 5 =$ ☐

2 marks

Q3 A decorator has to paint $5\frac{1}{2}$ rooms by the end of the week.

He has already completed $1\frac{3}{7}$ of the rooms.

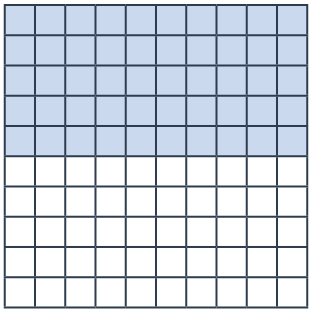
How many rooms does he have left to complete? Give your answer as a mixed number.

☐ rooms

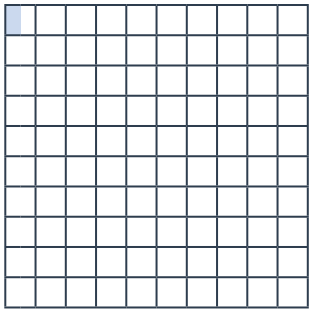
1 mark

Q1 Ryan and Simran have both attempted to represent half a percent using a hundred square.

Ryan



Simran



Who has coloured half a percent correctly?
RYAN / SIMRAN Explain your answer.

See mark scheme for example

1 mark

Q2 Draw a pair of brackets in **ONE** of these calculations so that they make two different answers. What are the answers?

$50 - 10 \times 5 =$ **0**

$50 - 10 \times 5 =$ **200**

2 marks

Q3 A decorator has to paint $5\frac{1}{2}$ rooms by the end of the week.

He has already completed $1\frac{3}{7}$ of the rooms.

How many rooms does he have left to complete? Give your answer as a mixed number.

$4\frac{1}{14}$ rooms

1 mark

	Requirement	Mark	Additional guidance
Q1	Simran is correct. Award the mark for an appropriate explanation as well as the recognition that Simran is correct.	1	Accept answers where any of the following are mentioned: Ryan has coloured in half of the whole square, which is the same as 50%. Each individual square is worth 1% and so half a percent is half of one square.
Q2	Award ONE mark for each of the following (given in any order): $50 - 10 \times 5 = 0$ $(50 - 10) \times 5 = 200$	2	Note that both the correct positioning of brackets **AND** a correct answer are necessary to achieve the mark for the second calculation.
Q3	$4\frac{1}{14}$	1	

Q1 A milkshake machine fills a glass with $\frac{3}{20}$ of a litre and then breaks down.

a What **percentage** of a litre of milkshake is in the glass?

_____ % of a l

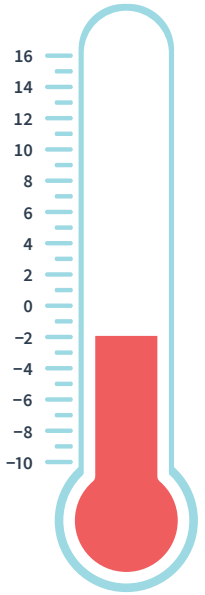
1 mark

b Write the amount of milkshake as a **decimal** proportion of a litre.

_____ l

1 mark

Q2 This thermometer shows the temperature on Saturday.



a On Sunday, the temperature increases by 8 degrees.

What is the temperature on Sunday?

_____ °C

1 mark

b On Monday the temperature is −7°C.

What is the difference between the temperature on Monday compared to Saturday?

On Monday, the temperature is _____ degrees **higher** / **lower** than Saturday.

1 mark

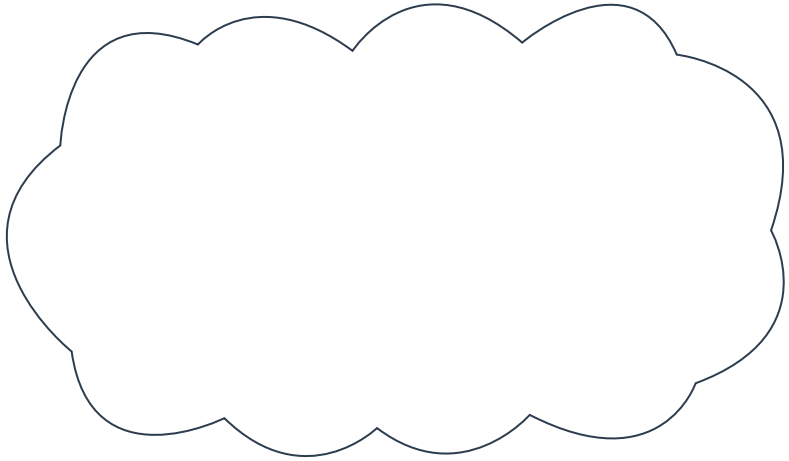
Q3 Samir has 26m of fencing and wants to make an outdoor run for his rabbit.

The run must be rectangular.

Samir says, "The perimeter will always be 26m, so the area inside the run will be the same, whatever size I make the rectangle."

Is Samir correct? **YES** / **NO**

Explain your answer.



2 marks

Q1 A milkshake machine fills a glass with $\frac{3}{20}$ of a litre and then breaks down.

a What **percentage** of a litre of milkshake is in the glass?

15 % of a l

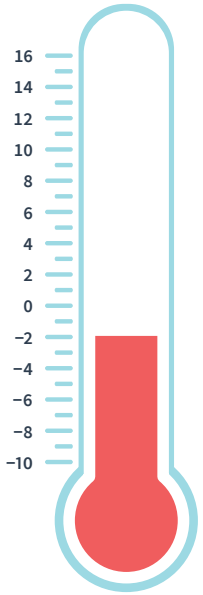
1 mark

b Write the amount of milkshake as a **decimal** proportion of a litre.

0.15 l

1 mark

Q2 This thermometer shows the temperature on Saturday.



a On Sunday, the temperature increases by 8 degrees.

What is the temperature on Sunday?

6 °C

1 mark

b On Monday the temperature is −7°C.

What is the difference between the temperature on Monday compared to Saturday?

On Monday, the temperature is 5 degrees **higher** / lower than Saturday.

1 mark

Q3 Samir has 26m of fencing and wants to make an outdoor run for his rabbit.

The run must be rectangular.

Samir says, "The perimeter will always be 26m, so the area inside the run will be the same, whatever size I make the rectangle."

Is Samir correct? **YES** / **NO**

Explain your answer.

See mark scheme for example

2 marks

	Requirement	Mark	Additional guidance
Q1a	15% of a litre	1	
Q1b	0.15l	1	
Q2a	6°C	1	
Q2b	5 degrees lower	1	Only award mark if both 5 degrees **AND** the fact it is lower are indicated.
Q3	**NO** — Samir is not correct. The perimeter will always be 26m, but by using different lengths and widths, the area of Samir's rectangle may be different. Award the marks for both an appropriate explanation (or example) as well as the recognition that Samir is not correct. Also award a mark for providing examples: A 10m × 3m rectangle has a perimeter of 26m and an area of $30m^2$. A 7m × 6m rectangle also has a perimeter of 26m, but has an area of $42m^2$.	2	

What are examiners looking for?

Q1 A milkshake machine fills a glass with $\frac{3}{20}$ of a litre and then breaks down.

a What **percentage** of a litre of milkshake is in the glass?

15 % of a l

1 mark

b Write the amount of milkshake as a **decimal** proportion of a litre.

0.15 l

1 mark

Why are we asking this question?

This question is designed to assess children's ability to recall and use equivalences between simple fractions, decimals and percentages.

What common errors do we expect to see?

Some children may make incorrect links between the fractional representation and percentage/decimal equivalences, thinking that the numbers from the fraction are repeated in these equivalences. These children may give answers such as 20% of a litre (for Part a) or 3.20l (for Part b).

How to encourage children to solve this question

The key to solving this problem is for children to convert the original fraction so that it becomes $\frac{15}{100}$. Once the fraction is written in hundredths, it is easily written as a percentage (because a percentage is an amount out of 100) and a decimal (because the hundredth column can be used to help). To encourage children to do this, ask them to describe what a percentage means (a value out of 100). Is there a way to convert the fraction so that the denominator becomes 100?

Children may then benefit from sketching a place–value grid to model how to represent $\frac{15}{100}$ as a decimal.

Q1

Calculation A: 53,000 − 19,988 + 12

Calculation B: (0.23 + 1.77) × 50 × 1.77

Jade says, "These calculations look complicated, but there are quick ways to work out the answers in my head."

Show that Jade is correct by finding the answers.

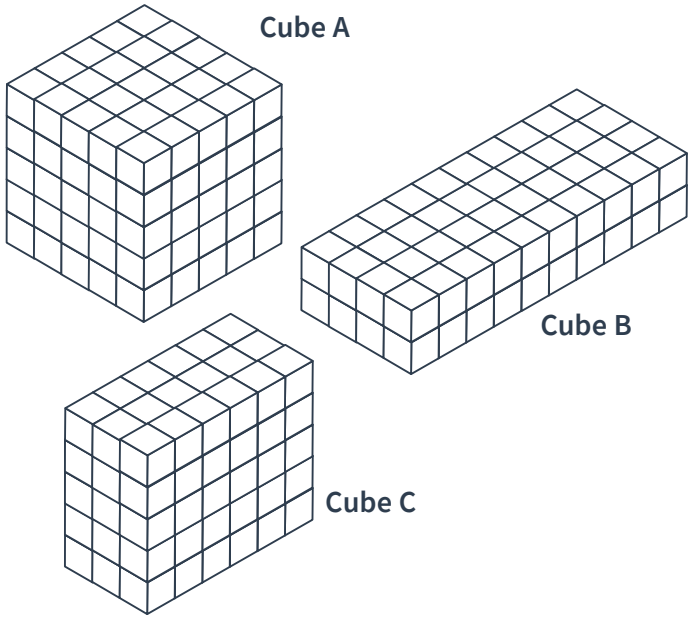
Calculation A: ☐

Calculation B: ☐

2 marks

Q2

Each of these 3D shapes is formed from centimetre cubes.



How many cubes are used to make each shape?

Shape A = ☐ cubes

Shape B = ☐ cubes

Shape C = ☐ cubes

2 marks

Q3 Write the symbols <, > or = to compare each pair of calculations.

$\frac{1}{3} \div 4 \square \frac{1}{2} \div 5$

$\frac{1}{4} \div 5 \square \frac{1}{10} \div 2$

$\frac{1}{6} \div 4 \square \frac{1}{5} \div 5$

2 marks

Q1

Calculation A: 53,000 − 19,988 + 12

Calculation B: (0.23 + 1.77) × 50 × 1.77

Jade says, "These calculations look complicated, but there are quick ways to work out the answers in my head."

Show that Jade is correct by finding the answers.

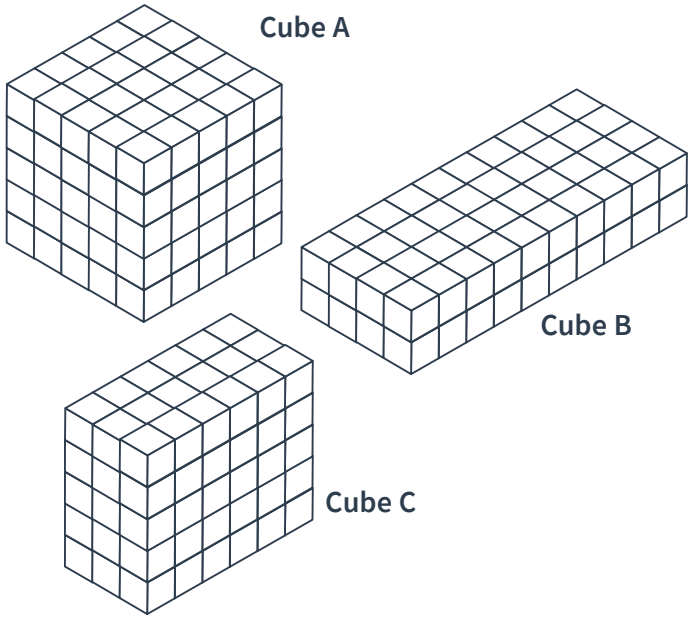
Calculation A: 33,000

Calculation B: 177

2 marks

Q2

Each of these 3D shapes is formed from centimetre cubes.



How many cubes are used to make each shape?

Shape A = 125 cubes

Shape B = 80 cubes

Shape C = 90 cubes

2 marks

Q3 Write the symbols <, > or = to compare each pair of calculations.

$\frac{1}{3} \div 4$ [<] $\frac{1}{2} \div 5$

$\frac{1}{4} \div 5$ [=] $\frac{1}{10} \div 2$

$\frac{1}{6} \div 4$ [>] $\frac{1}{5} \div 5$

2 marks

	Requirement	Mark	Additional guidance
Q1	Award **ONE** mark for each answer. Calculation A = 33,000 Calculation B = 177	2	
Q2	Shape A = 125 cubes Shape B = 80 cubes Shape C = 90 cubes Award **TWO** marks for all three correct answers. Award **ONE** mark for any two correct answers.	2	
Q3	<, =, > Award **TWO** marks for all correct symbols. Award **ONE** mark for any two correct symbols.	2	

Q1 Ali takes some number phrase cards from a pack and makes two different amounts.

Write the two numbers she makes.

six million | thirty thousand | five

nine million | two hundred thousand | thirty

2 marks

Q2 Ola has calculated a subtraction using the vertical method.

She covers over three of the digits to make a number puzzle.

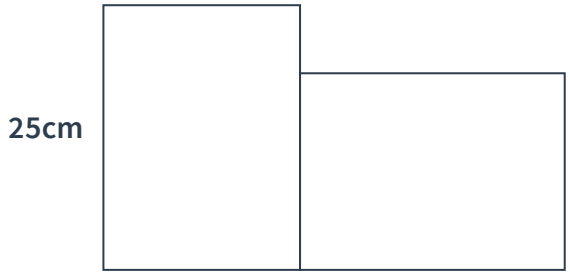
$$\begin{array}{r} 6\ 2\ 4\ \square\ 5 \\ -\ \square\ 1\ 5\ 8\ 4 \\ \hline 4\ \square\ 8\ 9\ 1 \\ \hline \end{array}$$

Complete the missing digits.

2 marks

Q3 A set of rectangular bathroom tiles are each 25cm long and 16cm wide.

Mia's dad puts two tiles together to make a composite 'L' shape.



What is the perimeter of the shape Mia's dad makes?

cm

2 marks

Q1 Ali takes some number phrase cards from a pack and makes two different amounts.

Write the two numbers she makes.

six million | thirty thousand | five

6,030,005

nine million | two hundred thousand | thirty

9,200,030

2 marks

Q2 Ola has calculated a subtraction using the vertical method.

She covers over three of the digits to make a number puzzle.

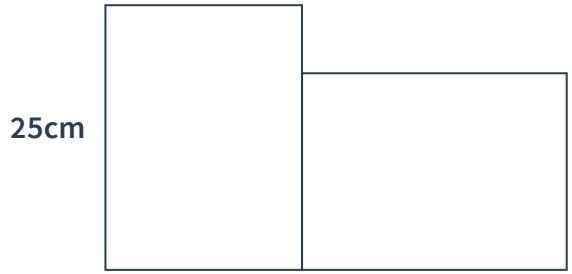
	6	2	4	7	5
−	2	1	5	8	4
	4	0	8	9	1

Complete the missing digits.

2 marks

Q3 A set of rectangular bathroom tiles are each 25cm long and 16cm wide.

Mia's dad puts two tiles together to make a composite 'L' shape.



What is the perimeter of the shape Mia's dad makes?

132 cm

2 marks

	Requirement	Mark	Additional guidance
Q1	6,030,005 9,200,030 Award a mark for each correct answer.	2	
Q2	$\begin{array}{r} 6\ 2\ 4\ \boxed{7}\ 5 \\ -\ \boxed{2}\ 1\ 5\ 8\ 4 \\ \hline 4\ \boxed{0}\ 8\ 9\ 1 \end{array}$ Award **TWO** marks for all three correct digits. Award **ONE** mark for any two correct digits.	2	
Q3	132 cm Award **TWO** marks for a correct answer. Award **ONE** mark for a correct method with one arithmetic error.	2	

Q1 There are 25 questions in a maths test.

Here are some children's scores.

Name	Score (out of 25)
Ashleigh	20
Ben	5
Charlie	10
Dara	15

a What **fraction** of the test did Dara get right?

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

1 mark

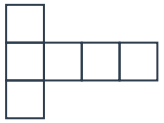
b What **percentage** of the test did Charlie get right?

_____ %

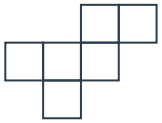
1 mark

Q2

A)



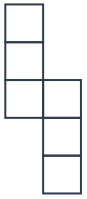
B)



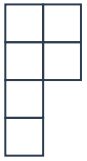
C)

D)

E)



F)



Write the letters of **three** of these nets that will fold to make a cube.

_____ _____ _____

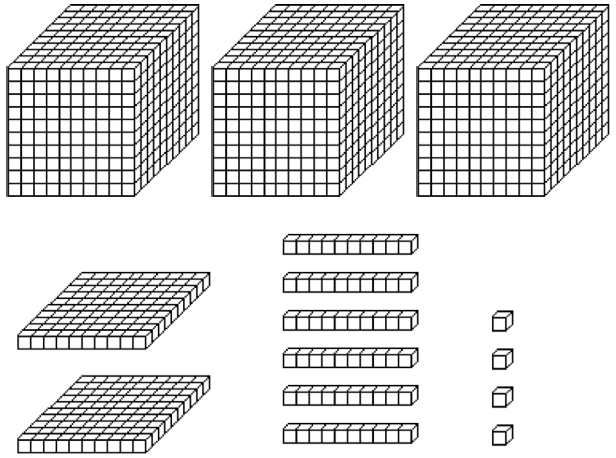
1 mark

Q3 Estimate where each of these numbers belongs on the number line.

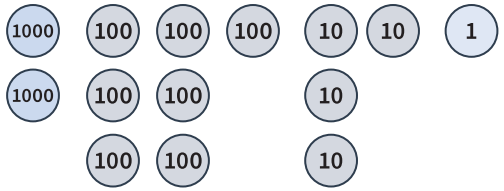
Draw arrows and label them A and B to show your estimates.

2 marks

A



B



Q1 There are 25 questions in a maths test.

Here are some children's scores.

Name	Score (out of 25)
Ashleigh	20
Ben	5
Charlie	10
Dara	15

a What **fraction** of the test did Dara get right?

$\frac{15}{25}$

1 mark

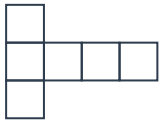
b What **percentage** of the test did Charlie get right?

40 %

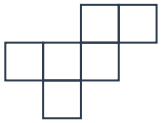
1 mark

Q2

A)



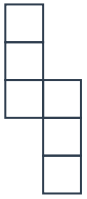
B)



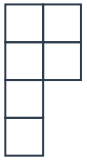
C)

D)

E)



F)



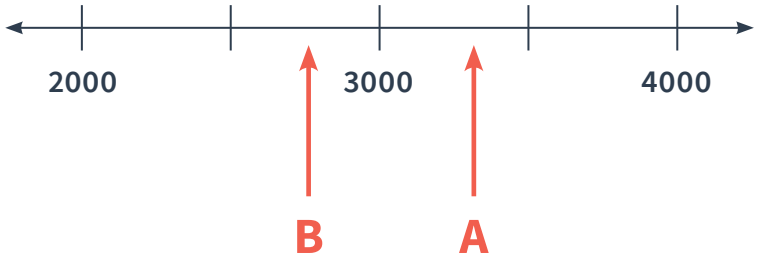
Write the letters of **three** of these nets that will fold to make a cube.

A | B | E

1 mark

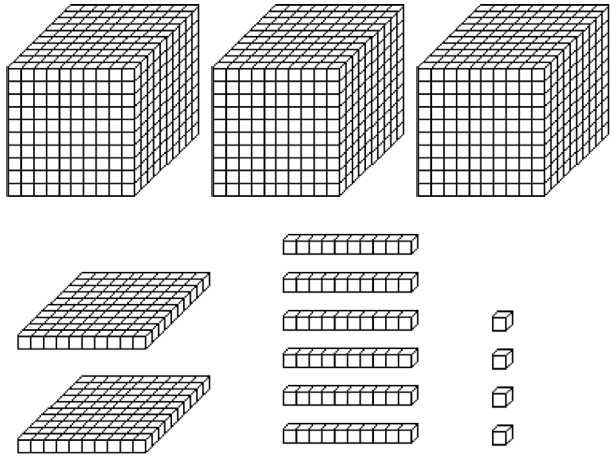
Q3 Estimate where each of these numbers belongs on the number line.

Draw arrows and label them A and B to show your estimates.

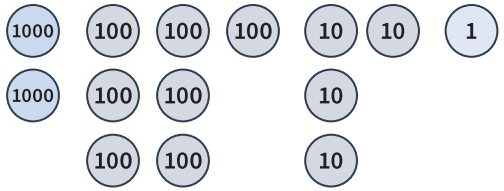


2 marks

A



B



	Requirement	Mark	Additional guidance
Q1a	$\frac{15}{25}$ or $\frac{3}{5}$ Accept any other equivalent fractions.	1	
Q1b	40%	1	
Q2	A, B and E	1	
Q3	Award a mark for reasonable estimates of each number as follows: Arrow A pointing to a position roughly midway between 3,000 and the unlabelled 3,500 notch, (representing 3,264). Arrow B pointing to a position roughly midway between the unlabelled 2,500 notch and 3,000 (representing 2,741).	2	

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Rapid Reasoning

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

Each pupil could receive a personalised lesson every week from our specialist 1-to-1 maths tutors.

- Raise attainment
- Plug any gaps or misconceptions
- Boost confidence

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