



THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions
and curriculum resources

Rapid Reasoning

Year 6 | Weeks 19-24



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and curriculum resources

Rapid Reasoning

Year 6 | Week 23

This week, the questions this week within *Rapid Reasoning* focus on proportionally, including ratio, percentages and scaling.

This week, the following objectives are introduced for the first time:

- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

The following Year 6 objectives, which were first introduced earlier in the term, will also be a focus this week:

- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- solve problems involving similar shapes where the scale factor is known or can be found.

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

Ashley makes a number out of six digit cards.

She adds 72,914 to her number to get a new number.

She then subtracts 18,475 from her new number to get a final amount of 327,190.

What were the digit cards Ashley started off with? Show your working.

2 marks**Q2**

Match these calculations with the best estimation of their answers.

Use rounding to help you decide.

$37,014 + 57,991$	95,500
$46,999 + 47,497$	95,000
$67,009 + 26,995$	94,000
$12,503 + 82,996$	94,500

2 marks

Q3

Here are two number sequences:

A) $-32, -25, -18, -11, -4$ B) $-0.5, -0.8, -1.1, -1.4, -1.8$

Each sequence has a different rule.

Write the rule for each sequence.

Rule A =

Rule B =

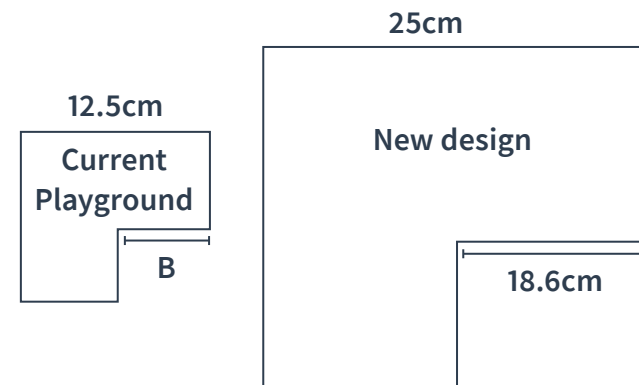
2 marks

Challenge Question**Q4**

Attley Primary Academy is increasing the size of its playground.

It will keep the same shape, but the dimensions will increase by a scale factor.

The plans for the new playground look like this.

*Not to scale*

How long is distance B on the current playground?

 m

1 mark

Q1 Ashley makes a number out of six digit cards.

She adds 72,914 to her number to get a new number.

She then subtracts 18,475 from her new number to get a final amount of 327,190.

What were the digit cards Ashley started off with? Show your working.

2	7	2	7	5	1
---	---	---	---	---	---

2 marks

Q2 Match these calculations with the best estimation of their answers.

Use rounding to help you decide.

$37,014 + 57,991$	•	
$46,999 + 47,497$	•	
$67,009 + 26,995$	•	
$12,503 + 82,996$	•	
		$95,500$ $95,000$ $94,000$ $94,500$

2 marks

Q3

Here are two number sequences:

A) $-32, -25, -18, -11, -4$ B) $-0.5, -0.8, -1.1, -1.4, -1.8$

Each sequence has a different rule.

Write the rule for each sequence.

Rule A =

 $+ 7$

Rule B =

 $- 0.3$

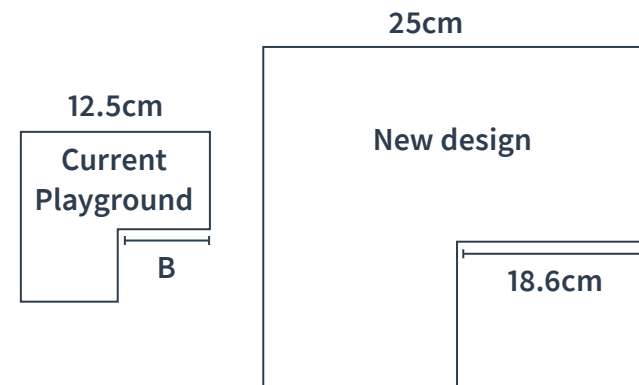
2 marks

Challenge Question**Q4**

Attley Primary Academy is increasing the size of its playground.

It will keep the same shape, but the dimensions will increase by a scale factor.

The plans for the new playground look like this.

*Not to scale*

How long is distance B on the current playground?

 9.3

m

1 mark

	Requirement	Mark	Additional guidance
Q1	<p>2 7 2 7 5 1</p> <p>Award TWO marks for all six digits (given in any order).</p> <p>Award ONE mark for a correct method, but where there is one arithmetic error and so the six digits differ from the correct ones.</p>	2	
Q2	<div> <div> <p>37,014 + 57,991</p> <p>46,999 + 47,497</p> <p>67,009 + 26,995</p> <p>12,503 + 82,996</p> </div> <div> <p>95,500</p> <p>95,000</p> <p>94,000</p> <p>94,500</p> </div> </div> <p>Award TWO marks for all calculations and estimates matched correctly.</p> <p>Award ONE mark for any two or three calculations and estimates matched correctly.</p>	2	
Q3	<p>Rule A = + 7 Rule B = − 0.3</p> <p>Award ONE mark for each rule correctly identified.</p>	2	
Q4	9.3m	1	

Q1

Izzy is working out the answer to a calculation.

She shifts the digits of a number three places to the left.

Her answer is 5,390.

Write Izzy's calculation as a number sentence.

1 mark

Q2

Mo uses four digit cards and some zeros to make a seven-digit number on a place-value grid.

2 6 9 1

M	HTh	TTh	Th	H	T	O	.	t	h	th
							.			

Mo places the digit with the lowest value in the place with the highest value.

He then places the 6 so that it has a value of 60,000.

Finally, he places the digit with the highest value in the place with the lowest value.

What could Mo's number be? Write your answer in words.

1 mark

Q3

At Antonio's Ice Cream Shop, the Raspberry Deluxe Sundae is made by using a ratio of 3 scoops of raspberry ripple ice cream for every 1 scoop of cookie crunch ice cream.

Antonio wants to make an extra-large sundae using 12 scoops of ice cream in total.

How many scoops of each flavour should he use?

Raspberry ripple = scoops

Cookie crunch = scoops

1 mark

Challenge Question

Q4

Barndale Books is having a book sale.

Many of the books have had their prices reduced.

The full price of Book A is £3.90 but it has a discount of 10% off.

The full price of Book B is £5.70 but is now being sold at 60% of the normal price.

Which book is cheaper? Show your working

Book

is cheaper. It costs

£

2 marks

Q1

Izzy is working out the answer to a calculation.

She shifts the digits of a number three places to the left.

Her answer is 5,390.

Write Izzy's calculation as a number sentence.

$$5.39 \times 1,000 = 5,390$$

1 mark

Q2

Mo uses four digit cards and some zeros to make a seven-digit number on a place-value grid.

2 6 9 1

M	HTh	TTh	Th	H	T	O	.	t	h	th
							.			

Mo places the digit with the lowest value in the place with the highest value.

He then places the 6 so that it has a value of 60,000.

Finally, he places the digit with the highest value in the place with the lowest value.

What could Mo's number be? Write your answer in words.

one million two hundred and
sixty thousand and nine

1 mark

Q3

At Antonio's Ice Cream Shop, the Raspberry Deluxe Sundae is made by using a ratio of 3 scoops of raspberry ripple ice cream for every 1 scoop of cookie crunch ice cream.

Antonio wants to make an extra-large sundae using 12 scoops of ice cream in total.

How many scoops of each flavour should he use?

Raspberry ripple = scoops

Cookie crunch = scoops

1 mark

Challenge Question**Q4**

Barndale Books is having a book sale.

Many of the books have had their prices reduced.

The full price of Book A is £3.90 but it has a discount of 10% off.

The full price of Book B is £5.70 but is now being sold at 60% of the normal price.

Which book is cheaper? Show your working

Book

B

is cheaper. It costs

£ **3.42**

2 marks

	Requirement	Mark	Additional guidance
Q1	$5.39 \times 1,000 = 5,390$	1	
Q2	Accept any one of the following numbers: one million two hundred and sixty thousand and nine one million sixty-two thousand and nine one million sixty thousand two hundred and nine one million sixty thousand and twenty-nine	1	
Q3	Raspberry ripple = 9 scoops Cookie crunch = 3 scoops	1	
Q4	Book B is cheaper. It costs £3.42 . Award TWO marks for a correct answer. Award ONE mark for a correct method and one arithmetic error.	2	

What are examiners looking for?**Q3**

At Antonio's Ice Cream Shop, the Raspberry Deluxe Sundae is made by using a ratio of 3 scoops of raspberry ripple ice cream for every 1 scoop of cookie crunch ice cream.

Antonio wants to make an extra-large sundae using 12 scoops of ice cream in total.

How many scoops of each flavour should he use?

Raspberry ripple = scoops

Cookie crunch = scoops

1 markWhy are we asking this question?

This question is designed to assess children's ability to solve problems involving the relative sizes of two quantities, where missing values can be found by using integer multiplication and division facts.

What common errors do we expect to see?

Some children may think that they need to multiply each number of scoops by 12 in order to find the answer (i.e. increasing the original ratio by 12 times the amount). These children will give an answer of 36 scoops of raspberry ripple and 12 scoops of cookie crunch ice cream.

How to encourage children to solve this question

With ratio problems such as this, a helpful strategy is for children to draw a quick table that includes a column showing the total number of scoops used. For example:

No. of scoops of raspberry ripple	No. of scoops of cookie crunch	Total number of scoops
3	1	4
6	2	8
9	3	12

It is important that children recognise that they need this final column as this is how they will arrive at the correct answer. Ask them which part of the problem shows that they need to record the total number of scoops.

Although bar models and concrete resources can also be used to model ratio problems, using a table such as this is a clear way of methodically finding the answer.

Q1

Number A is multiplied by 100, then divided by 10. The answer is 7.34.

Number B is divided by 1,000 and then doubled. The answer is 1.

What are numbers A and B?

A =

B =

1 mark

Q2

Every day a restaurant serves 872 carveries.

On average, each customer helps themselves to 25g of mashed potato.

How many kilograms of mashed potato does the chef need to prepare every day?

kg

2 marks

Q3

This table show the result of the public vote in the Total Talent TV Show Grand Final.

Name	Type of act	Percentage of the public vote
4-Ever	Boy band	13%
Street Rhythmz	Street dance group	15%
Trixie	Talking terrier	60%
Adi Cadabra	Magician	11%
Vera and Ethel	Synchronised knitters	1%

a

What proportion of the public vote did Vera and Ethel get? Write your answer as a decimal.

of the public vote

1 mark

b

What fraction of the public vote did Trixie the talking terrier get? Give **two** possible fractions.

or

of the public vote

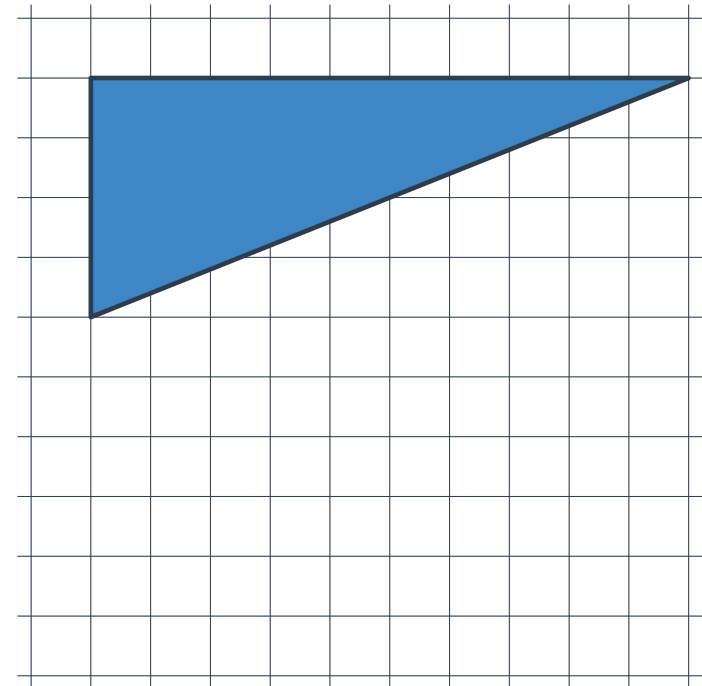
1 mark

Challenge Question

Q4

A triangle is increased in size by a scale factor of 2.

This is the new triangle.



Draw the original triangle on the grid.

1 mark

Q1

Number A is multiplied by 100, then divided by 10. The answer is 7.34.

Number B is divided by 1,000 and then doubled. The answer is 1.

What are numbers A and B?

A = **0.734**

B = **500**

1 mark

Q2

Every day a restaurant serves 872 carveries.

On average, each customer helps themselves to 25g of mashed potato.

How many kilograms of mashed potato does the chef need to prepare every day?

21.8 kg

2 marks

Q3

This table show the result of the public vote in the Total Talent TV Show Grand Final.

Name	Type of act	Percentage of the public vote
4-Ever	Boy band	13%
Street Rhythmz	Street dance group	15%
Trixie	Talking terrier	60%
Adi Cadabra	Magician	11%
Vera and Ethel	Synchronised knitters	1%

a

What proportion of the public vote did Vera and Ethel get? Write your answer as a decimal.

0.01

of the public vote

1 mark

b

What fraction of the public vote did Trixie the talking terrier get? Give two possible fractions.

6

3

or

10

5

of the public vote

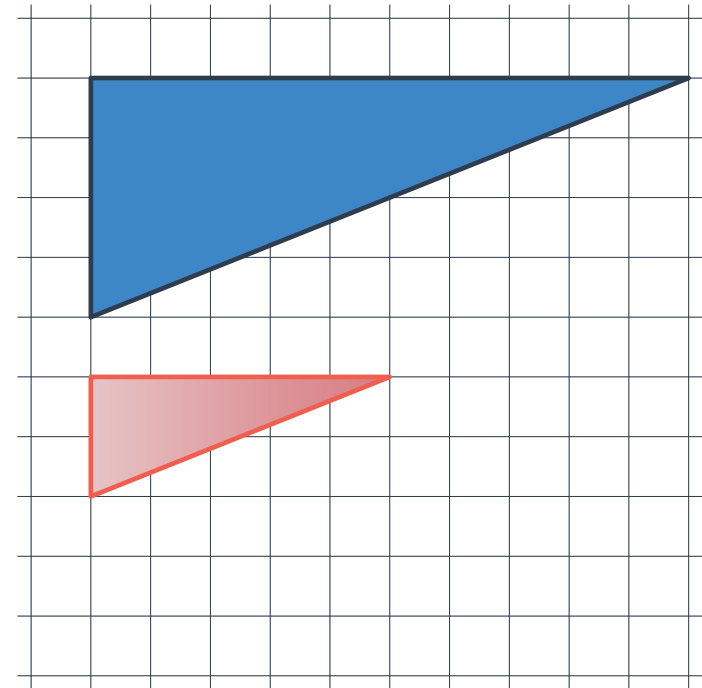
1 mark

Challenge Question

Q4

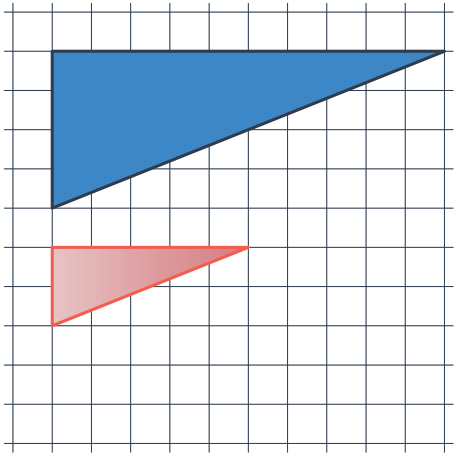
A triangle is increased in size by a scale factor of 2.

This is the new triangle.



Draw the original triangle on the grid.

1 mark

	Requirement	Mark	Additional guidance
Q1	A = 0.734 B = 500	1	
Q2	21.8 kg Award TWO marks for a correct answer. Award ONE mark for a correct method with one arithmetic error.	2	
Q3a	0.01	1	
Q3b	Accept any two fractions that are equivalent to 60%, for example: $\frac{60}{100}$ $\frac{6}{10}$ $\frac{3}{5}$	1	
Q4	 <p>Award ONE mark for a correctly drawn triangle, which can be positioned anywhere on the grid.</p>	1	

- Q1** A pizza restaurant uses this formula to work out the cost of a pizza:

$$C = 5 + (0.5 \times t)$$

Where C = the cost of the pizza in pounds (£)
and t = the number of toppings the customer chooses

- a** Nia orders a pizza with four toppings.

Use the formula to work out the cost of Nia's pizza.

£

1 mark

- b** Ellie orders a pizza with seven toppings.

How much more expensive is Ellie's pizza than Nia's?

£

1 mark

- Q2** A bottle of mineral water contains 0.78 litres of water.

Bottles are sold in packs of four.

How many litres of water are in two packs?

l

2 marks

Q3

This table shows the dimensions of three cuboid boxes.

Box	Length	Width	Height
A	50cm	20cm	10cm
B	45cm	10cm	30cm
C	50cm	40cm	5cm

Lucy wins a prize where she can fill one of the boxes with chocolate.

Lucy loves chocolate! Which box should she choose and what is its volume? Show your working.

Box . It has a volume of cm³

1 mark

Challenge Question

Q4

The Chaseley Steel Drum Youth Band has 35 members.

$\frac{2}{5}$ of these are boys.

How many boys and girls are in the Youth Band?

Number of boys = Number of girls =

2 marks

- Q1** A pizza restaurant uses this formula to work out the cost of a pizza:

$$C = 5 + (0.5 \times t)$$

Where C = the cost of the pizza in pounds (£)
and t = the number of toppings the customer chooses

- a** Nia orders a pizza with four toppings.

Use the formula to work out the cost of Nia's pizza.

£ **7**

1 mark

- b** Ellie orders a pizza with seven toppings.

How much more expensive is Ellie's pizza than Nia's?

£ **1.50**

1 mark

- Q2** A bottle of mineral water contains 0.78 litres of water.

Bottles are sold in packs of four.

How many litres of water are in two packs?

6.24 l

2 marks

Q3

This table shows the dimensions of three cuboid boxes.

Box	Length	Width	Height
A	50cm	20cm	10cm
B	45cm	10cm	30cm
C	50cm	40cm	5cm

Lucy wins a prize where she can fill one of the boxes with chocolate.

Lucy loves chocolate! Which box should she choose and what is its volume? Show your working.

Box

B

. It has a volume of

13,500 cm³

1 mark

Challenge Question**Q4**

The Chaseley Steel Drum Youth Band has 35 members.

$\frac{2}{5}$ of these are boys.

How many boys and girls are in the Youth Band?

Number of boys =

14

Number of girls =

21

2 marks

	Requirement	Mark	Additional guidance
Q1a	£7	1	
Q1b	£1.50	1	
Q2	6.24 litres Award TWO marks for a correct answer. Award ONE mark for a correct method with one arithmetic error.	2	
Q3	Box B 13,500cm ³	1	
Q4	Number of boys = 14 Number of girls = 21 Award TWO marks for correct answers. Award ONE mark for a correct method, but with one arithmetic error.	2	

Q1

Emily, Zara and Joe want to work out the answer to $150 - (7 + 9) \times 3$.

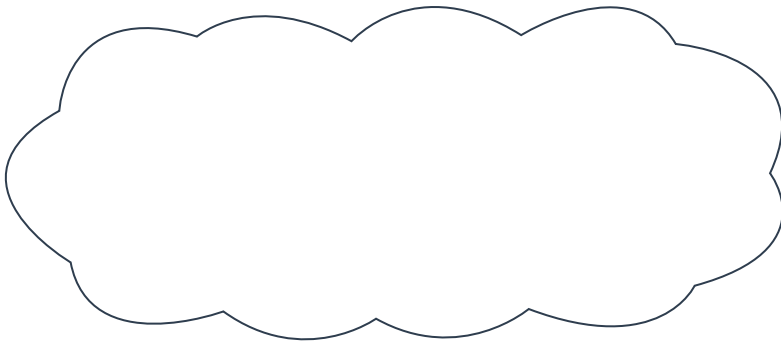
Emily says, "We need to add, then subtract, then multiply."

Zara says, "We need to add, then multiply, then subtract."

Joe says, "We need to subtract, then add, then multiply."

a

Who is correct? Explain why.



1 mark

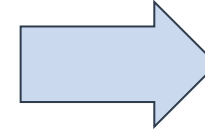
b

What is the answer to the calculation?

1 mark

Q2

Kyle and Jack have drawn this shape on a coordinate grid.



Kyle says, "If we translate this arrow in any way it will point in the same direction."

Jack says, "If we reflect this arrow in an axis, it will point in a different direction."

Is each statement **always**, **sometimes** or **never** true? Explain your answers.

Kyle's statement is true

because _____

Jack's statement is true

because _____

2 marks

Q3

1 mile is approximately equivalent to 1.6km

Use this information to complete the conversion table.

Miles	Kilometres
1	1.6
	16
50	
100	

2 marks

Challenge Question**Q4**

Two second-hand cars have had their prices reduced.

The full price of Car A should normally be £2,500, but its new price has a discount of 30% off.

The full price of Car B should be £2,250 but it is now being sold at 80% of the normal price.

Which car is cheaper? Show your working.

Car

is cheaper. It costs

£

2 marks

- Q1** Emily, Zara and Joe want to work out the answer to $150 - (7 + 9) \times 3$.
- Emily says, "We need to add, then subtract, then multiply."
- Zara says, "We need to add, then multiply, then subtract."
- Joe says, "We need to subtract, then add, then multiply."

a Who is correct? Explain why.

*See mark scheme
for example*

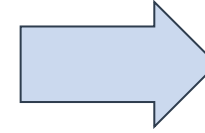
1 mark

b What is the answer to the calculation?

102

1 mark

- Q2** Kyle and Jack have drawn this shape on a coordinate grid.



- Kyle says, "If we translate this arrow in any way it will point in the same direction."
- Jack says, "If we reflect this arrow in an axis, it will point in a different direction."

Is each statement **always**, **sometimes** or **never** true? Explain your answers.

Kyle's statement is **always** true

because *See mark scheme
for example*

Jack's statement is **sometimes** true

because *See mark scheme
for example*

2 marks

Q3 1 mile is approximately equivalent to 1.6km

Use this information to complete the conversion table.

Miles	Kilometres
1	1.6
10	16
50	80
100	160

2 marks

Challenge Question

Q4 Two second-hand cars have had their prices reduced.

The full price of Car A should normally be £2,500, but its new price has a discount of 30% off.

The full price of Car B should be £2,250 but it is now being sold at 80% of the normal price.

Which car is cheaper? Show your working.

Car **A** is cheaper. It costs £ **1,750**

2 marks

	Requirement	Mark	Additional guidance
Q1a	<p>Zara is correct because the addition is in brackets and needs to be completed first.</p> <p>Multiplication comes before subtraction in the order of operations, so the other two operations need to be completed in that order.</p> <p>Only award the mark where an appropriate explanation is given as well as the recognition that Zara is correct.</p>	1	Accept any similar answer where a correct explanation of the order of operations is given.
Q1b	102	1	
Q2	<p>Award ONE mark for each correct answer (consisting of the correct term plus an appropriate explanation).</p> <p>Kyle's statement is always true because translating a shape does not reflect or rotate it in any way.</p> <p>Jack's statement is sometimes true because reflecting the shape in the x-axis will mean that the arrow is still pointing right. Reflecting the shape in the y-axis will mean that it is now pointing left.</p>	2	

	Requirement	Mark	Additional guidance										
Q3	<table><tr><th>Miles</th><th>Kilometres</th></tr><tr><td>1</td><td>1.6</td></tr><tr><td>10</td><td>16</td></tr><tr><td>50</td><td>80</td></tr><tr><td>100</td><td>160</td></tr></table>	Miles	Kilometres	1	1.6	10	16	50	80	100	160	2	
	Miles	Kilometres											
	1	1.6											
	10	16											
	50	80											
	100	160											
	Award TWO marks for all three correctly completed.												
Award ONE mark for any two correctly completed.													
Q4	Car A is cheaper. It costs £1,750.	2											
	Award TWO marks for a correct answer.												
	Award ONE mark for a correct method with one arithmetic error.												



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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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