THIRD SPACE LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 6 | Weeks 13-18

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Rapid Reasoning

Year 6 | Week 16

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

This week, children will be expected to solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison for the first time.

The recall and use of equivalences between simple fractions, decimals and percentages, including in different contexts, first introduced in Week 15, will also be a focus.

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 Jamil is adding together two five-digit numbers using the vertical addition method.

He has made a mistake.

$$\begin{array}{rrrrrr} & 4 & 6 & 5 & 3 & 2 \\ + & 1 & 4 & 3 & 8 & 7 \\ \hline & 5 & 0 & 8 & 1 & 9 \\ \hline \end{array}$$

Explain Jamil's mistake and write the correct answer.

Jamil's mistake is _____

_____

_____

The correct answer should be: ☐

2 marks

Q2 These calculations have different answers. What are they?

$60 + (15 - 10) \times 2 =$ ☐

$(60 + 15) - 10 \times 2 =$ ☐

2 marks

Q3 Rachel and Max are playing a computer game.

The game has 160 levels.

Rachel's counter says she has completed 60% of the game.

Max's counter says that he has completed 45% of the game.

Which levels are they each on?

Rachel = level ☐

Max = level ☐

2 marks

Q1 Jamil is adding together two five-digit numbers using the vertical addition method.

He has made a mistake.

$$\begin{array}{rrrrrr} & 4 & 6 & 5 & 3 & 2 \\ + & 1 & 4 & 3 & 8 & 7 \\ \hline & 5 & 0 & 8 & 1 & 9 \\ \hline \end{array}$$

Explain Jamil's mistake and write the correct answer.

Jamil's mistake is

See mark scheme

for example

The correct answer should be: **60,919**

2 marks

Q2 These calculations have different answers. What are they?

$60 + (15 - 10) \times 2 =$ **70**

$(60 + 15) - 10 \times 2 =$ **55**

2 marks

Q3 Rachel and Max are playing a computer game.

The game has 160 levels.

Rachel's counter says she has completed 60% of the game.

Max's counter says that he has completed 45% of the game.

Which levels are they each on?

Rachel = level **96**

Max = level **72**

2 marks

	Requirement	Mark	Additional guidance
Q1	Answers should recognise that Jamil has not exchanged after adding the tens and thousands digits. The 10,000s digit and 100s digit should both be 1 more. Correct answer: 60,919 Award **ONE** mark for appropriate identification of error and **ONE** mark for correct answer.	2	
Q2	70, 55 Award **ONE** mark for each correct answer.	2	
Q3	Rachel = level 96 Max = level 72 Award **ONE** mark for each correct answer.	2	

Q1 There are three mistakes in this table — one in each row.

	Decimal	Fraction	Percentage
Row A	0.80	$\frac{8}{10}$	8%
Row B	0.12	$\frac{1}{12}$	12%
Row C	0.25	$\frac{2}{5}$	40%

Circle each mistake and write the correct values below.

Row A ☐

Row B ☐

Row C ☐

2 marks

Q2 Farmworth's Foods needs to deliver 4,297 tins of sweetcorn to a supermarket.

The tins are delivered on wooden pallets.

Each pallet can contain 25 tins.

How many pallets will be needed to deliver all of the cans?

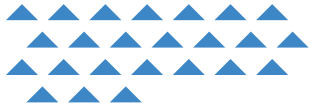
☐ pallets

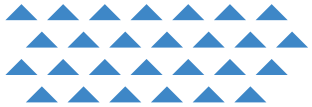
2 marks

Q3 Use the symbols <, > or = to compare each amount.

$\frac{1}{2}$ of this amount ☐ $\frac{2}{3}$ of this amount

$\frac{3}{4}$ of this amount ☐ $\frac{2}{3}$ of this amount





2 marks

Q1 There are three mistakes in this table — one in each row.

	Decimal	Fraction	Percentage
Row A	0.80	$\frac{8}{10}$	8%
Row B	0.12	$\frac{1}{12}$	12%
Row C	0.25	$\frac{2}{5}$	40%

Circle each mistake and write the correct values below.

Row A: 80%

Row B: $\frac{12}{100}$

Row C: 0.4

2 marks

Q2 Farmworth's Foods needs to deliver 4,297 tins of sweetcorn to a supermarket.

The tins are delivered on wooden pallets.

Each pallet can contain 25 tins.

How many pallets will be needed to deliver all of the cans?

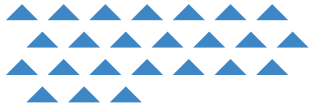
172 pallets

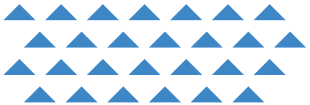
2 marks

Q3 Use the symbols <, > or = to compare each amount.

$\frac{1}{2}$ of this amount **<** $\frac{2}{3}$ of this amount

$\frac{3}{4}$ of this amount **=** $\frac{2}{3}$ of this amount





2 marks

	Requirement	Mark	Additional guidance
Q1	**Row A:** Circled mistake = 8% Corrected mistake = 80% **Row B:** Circled mistake = $\frac{1}{12}$ Corrected mistake = any fraction equivalent to $\frac{12}{100}$ **Row C:** Circled mistake = 0.25 Corrected mistake = 0.4 or 0.40 Award **TWO** marks for all mistakes correctly identified and corrected. Award **ONE** mark for any two mistakes correctly identified and corrected.	2	

	Requirement	Mark	Additional guidance
Q2	172 pallets Award **TWO** marks for a correct answer. Award **ONE** mark for a correct method, but with one arithmetic error. Also award **ONE** mark for any answer showing a correct method, but where the remainder has not been rounded up to the next whole number of pallets (171 pallets remainder 22) or has even been rounded down without mentioning the remainder (171 pallets).	2	
Q3	<, = Award **ONE** mark for each correct symbol.	2	

What are examiners looking for?

Q1 **There are three mistakes in this table — one in each row.**

	Decimal	Fraction	Percentage
Row A	0.80	$\frac{8}{10}$	8%
Row B	0.12	$\frac{1}{12}$	12%
Row C	0.25	$\frac{2}{5}$	40%

Circle each mistake and write the correct values below.

Row A 80%

Row B $\frac{12}{100}$

Row C 0.4

2 marks

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 fractions/decimals/percentages. Within the context of this particular problem, these may include:

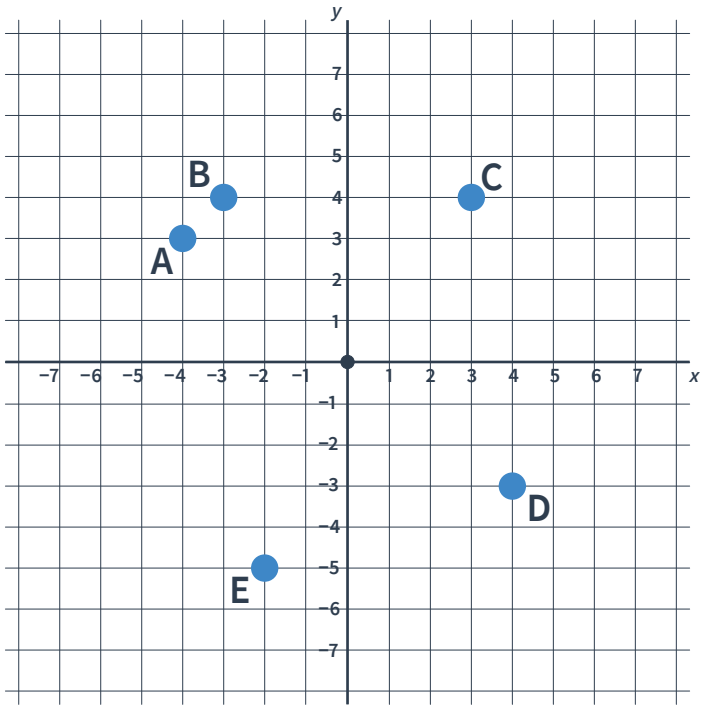
- equating $\frac{8}{10}$ with 8% because either (a) they think that a percentage is denoted by a number of tenths or (b) they incorrectly think that the denominator in a fraction automatically gives the percentage
- equating fractions with decimals because they feature similar numbers (e.g. thinking that 0.12 = $\frac{1}{12}$ or 0.25 = $\frac{2}{5}$ because they look similar). The converse of this is that some children may view 40% as being different from $\frac{2}{5}$ because the numbers look different.

How to encourage children to solve this question

Children should be encouraged to think of the problem as looking for two values in each row that are the same (rather than looking for the one value that is different). Comparing decimals with percentages is perhaps the quickest way to do this. For example, children will be able to see immediately in the first row that 0.80 and 8% are not equivalent, so one of them must be the odd one out. In the same way, 0.12 and 12% are immediately identifiable as the same in the second row, so children know the fraction must be the odd one out. Finally, in the third row, 0.25 and 40% are not equivalent, so one of them must be the odd one out.

Q1 Year 6 children are taking part in an outdoor activity.

This grid helps them to locate different flags that are placed around the school grounds.



a The children are told to go to pick up the flag at coordinates (– 3, 4).

Which letter on the grid marks this position?

_____

1 mark

b What are the coordinates for the position of flag E?

(_____ , _____)

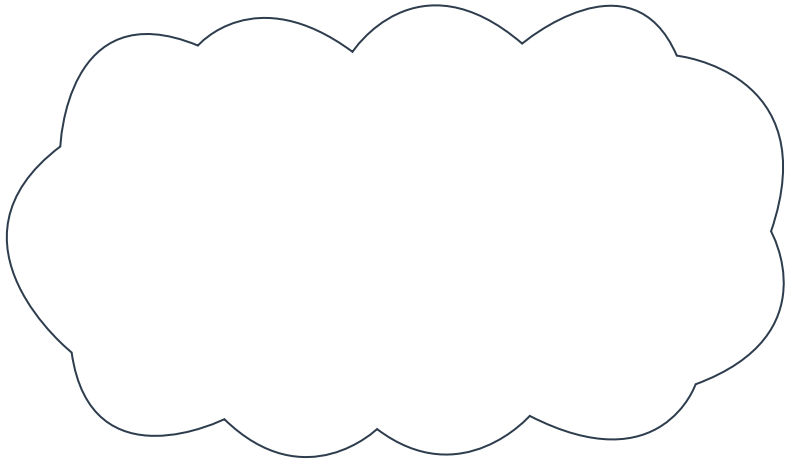
1 mark

Q2 Nia is looking at the calculation 15 × 10 ÷ 5.

She says, "Using brackets in this calculation doesn't make a difference to the answer."

Is Nia correct? **YES** / **NO**

Explain your answer.



2 marks

Q3 An aeroplane flies from London to Paris.

The distance between these two cities is 210km.

On the journey, the pilot announces, "We are now 35% of the way through the flight."

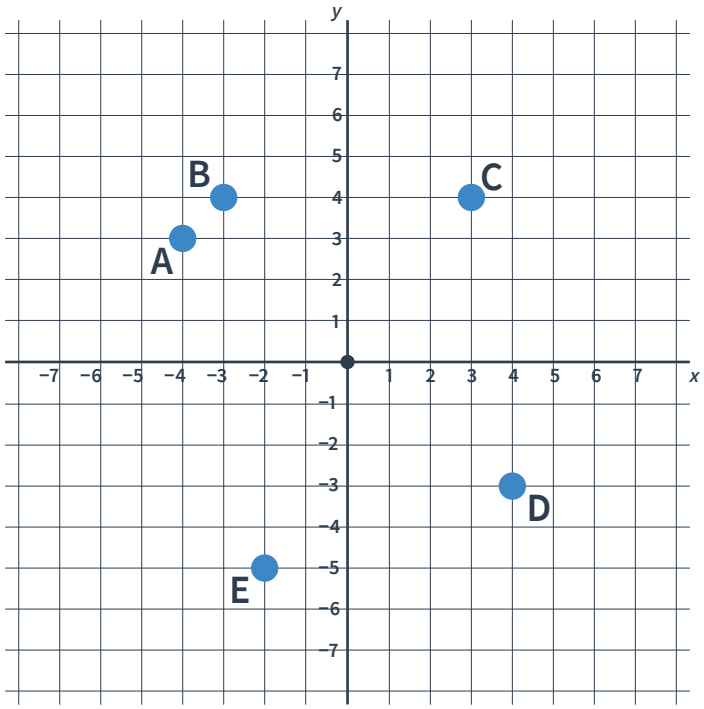
How far has the aeroplane travelled?

km

2 marks

Q1 Year 6 children are taking part in an outdoor activity.

This grid helps them to locate different flags that are placed around the school grounds.



a The children are told to go to pick up the flag at coordinates (– 3, 4).

Which letter on the grid marks this position?

B

1 mark

b What are the coordinates for the position of flag E?

(−1 , −5)

1 mark

Q2 Nia is looking at the calculation 15 × 10 ÷ 5.

She says, "Using brackets in this calculation doesn't make a difference to the answer."

Is Nia correct? **YES** / **NO**

Explain your answer.

See mark scheme for example

2 marks

Q3 An aeroplane flies from London to Paris.

The distance between these two cities is 210km.

On the journey, the pilot announces, "We are now 35% of the way through the flight."

How far has the aeroplane travelled?

$73\frac{1}{2}$ km

2 marks

	Requirement	Mark	Additional guidance
Q1a	B	1	
Q1b	(– 1, – 5)	1	
Q2	**YES** — Nia is correct. 15 × 10 ÷ 5 equals 30 and 15 × (10 ÷ 5) also equals 30. An appropriate explanation as well as the recognition that Nia is correct is necessary to achieve the mark.	2	Accept explanations where children work through each calculation to prove the answers are equivalent: 15 × 10 ÷ 5 = 150 ÷ 5 = 30 15 × (10 ÷ 5) = 15 × 2 = 30 Also accept more general reasoning, for example: When a calculation contains only multiplication and division, it does not matter which part is completed first.
Q3	$73\frac{1}{2}$ km Award **TWO** marks for a correct answer. Award **ONE** mark for a correct method, but with one arithmetic error.	2	

Q1 Michael has $\frac{3}{4}$ of a DVD left to watch.

His mum says, "You can watch $\frac{1}{2}$ of what is left, but then you've got to go to bed."

What fraction of the DVD will Michael still have left to watch?

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

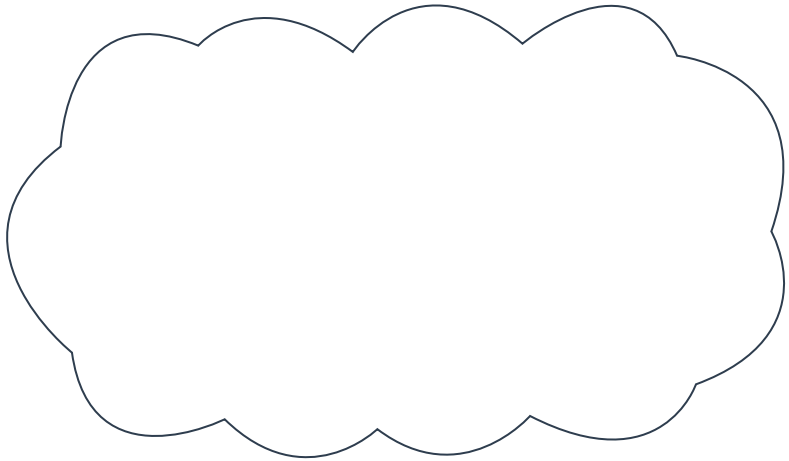
1 mark

Q2 Leah wants to find 5% of 480.

She says, "I know that I need to divide by 10 to find 10%, so I think I should divide by 5 to find 5%. The answer is 96."

Leah has made a mistake.

Explain Leah's mistake and give the correct answer.



1 mark

Q3 Match the correct value of the digit 6 as it appears in each number.

1,467,359	six million
6,497,531	six hundred thousand
1,735,694	six thousand
1,634,795	six hundred
	sixty thousand

2 marks

Q1 Michael has $\frac{3}{4}$ of a DVD left to watch.

His mum says, "You can watch $\frac{1}{2}$ of what is left, but then you've got to go to bed."

What fraction of the DVD will Michael still have left to watch?

$\frac{3}{8}$

1 mark

Q2 Leah wants to find 5% of 480.

She says, "I know that I need to divide by 10 to find 10%, so I think I should divide by 5 to find 5%. The answer is 96."

Leah has made a mistake.

Explain Leah's mistake and give the correct answer.

See mark scheme for example

1 mark

Q3 Match the correct value of the digit 6 as it appears in each number.

2 marks

	Requirement	Mark	Additional guidance
Q1	$\frac{3}{8}$	1	
Q2	Leah needs to divide by the number of 5s in 100 not by 5. So, she needs to work out 480 ÷ 20 which equals 24.	1	Also accept answers which describe alternative methods of finding 5%. For example: To find 5%, Leah needs to divide by 10 to find 10% and find half of that answer.
Q3	Values matched as follows:  Award TWO marks for all values correctly matched. Award ONE mark for any two or three values correctly matched.	2	

Q1 Number A is multiplied by 1,000.
The answer is 4,802.

What is Number A worth?

Number B is multiplied by 1,000 and then divided by 100. The answer is 85.20.

What is Number B worth?

2 marks

Q2 There are 32 levels in a computer game.

The maximum number of points that can be achieved for each level is 1,450.

Hauwa completes the game and scores maximum points.

How many points does Hauwa score altogether?

points

2 marks

Q3 The same subtraction is typed into three calculators.

The subtraction is 96,013 − 13,998.

Two of the calculators are broken and give wrong answers.

One of them is correct.

Use **estimation** to work out which of the calculators is correct.

Write your estimation as a number sentence.

[ ] − [ ] = [ ]

1 mark

Q1 Number A is multiplied by 1,000.
The answer is 4,802.

What is Number A worth?

4.802

Number B is multiplied by 1,000 and then divided by 100. The answer is 85.20.

What is Number B worth?

8.52

2 marks

Q2 There are 32 levels in a computer game.

The maximum number of points that can be achieved for each level is 1,450.

Hauwa completes the game and scores maximum points.

How many points does Hauwa score altogether?

46,400 points

2 marks

Q3 The same subtraction is typed into three calculators.

The subtraction is 96,013 − 13,998.

Two of the calculators are broken and give wrong answers.

One of them is correct.

Use **estimation** to work out which of the calculators is correct.

Write your estimation as a number sentence.

96,000 − 14,000 = 82,000

1 mark

	Requirement	Mark	Additional guidance
Q1a	4.802, 8.52 Award **ONE** mark for each correct decimal.	2	
Q2	46,400 points Award **TWO** marks for a correct answer. Award **ONE** mark for a correct method with one arithmetic error.	2	
Q3	**96,000 − 14,000 = 82,000** **C** Award the mark for showing an appropriate estimation as well as the recognition that Calculator C is correct. Accept any appropriate estimations.	1	

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Rapid Reasoning

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