THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 3 | Week 3

As this is the third week of *Rapid Reasoning*, hopefully children will be increasingly confident and able to answer all three questions in the time given.

This is the last week in which the Year 3 objectives introduced continue to focus on **place value**.

Year 3 objectives introduced in a reasoning context for the first time this week include:

- identifying, representing and estimating numbers using different representations

- counting from 0 in multiples of 4, 8, 50 and 100.

The following Year 3 objectives continue to be a focus from week 2:

- finding 10 or 100 more or less than a given number (remember, children should be encouraged to use their knowledge of place value in order to do this)

- reading and writing numbers up to 1,000 in numerals and words (extending from number 0 up to 100 from Year 2).

Objectives from *Fluent in Five* that are also tested in a reasoning context this week include:

- calculating statements for multiplication and division.

Please note that some questions are worth two marks, and by their very nature, answers to these questions are never clear-cut. For a full breakdown of how marks would be awarded for these questions, please refer to the mark schemes provided.

Q1 James writes his house number on a piece of paper.

He says, "100 **more** than my number is 742."

What house number does James live at?

_____
1 mark

Q2 Ashleigh has only written part of these number sentences.

Complete the missing numbers.

$\boxed{} \div 5 = 5$

$\boxed{} \times 2 = 18$

_____
1 mark

Q3

Write two different ways to make 20p using only these coins.

_____

_____

_____

_____
2 marks

Q1 James writes his house number on a piece of paper.

He says, "100 **more** than my number is 742."

What house number does James live at?

642

1 mark

Q2 Ashleigh has only written part of these number sentences.

Complete the missing numbers.

25 ÷ 5 = 5

9 × 2 = 18

1 mark

Q3

Write two different ways to make 20p using only these coins.

See mark scheme for examples

2 marks

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	Requirement	Mark	Additional guidance
Q1	642	1	
Q2	25 and 9 **ONE** mark awarded for **BOTH** numbers given in the correct order.	1	
Q3	Any **two** of: 10p + 5p + 5p 10p + 5p + 2p + 2p + 1p 5p + 5p + 5p + 2p + 2p + 1p **ONE** mark awarded for each correct combination of coins.	2	Combinations must be unique and not the same coins in a different order. Accept answers given without addition symbols (as long as each group is clearly denoted), answers given using numbers (without 'p' symbol) and answers where coins are drawn.

Q1 Put these cards into the spaces below to make two correct number sentences.

Use each card once.

| × | ÷ | = | = |

14 ☐ 2 ☐ 7

8 ☐ 2 ☐ 16

1 mark

Q2 Leah starts on the number 0 and counts forwards in 50s.

After zero, she says another six numbers.

What number does Leah count to?

1 mark

Q3

9	×	10	☐
100	÷	10	☐
16	÷	2	☐
3	×	5	☐

Tick all the calculations that will still give the same answer if you swapped the two numbers cards.

1 mark

Q1 Put these cards into the spaces below to make two correct number sentences.

Use each card once.

$\times$ $\div$ =   =

14 $\boxed{\div}$ 2 $\boxed{=}$ 7

8 $\boxed{\times}$ 2 $\boxed{=}$ 16

1 mark

Q2 Leah starts on the number 0 and counts forwards in 50s.

After zero, she says another six numbers.

What number does Leah count to?

300

1 mark

Q3

9	×	10	✓
100	÷	10	☐
16	÷	2	☐
3	×	5	✓

Tick all the calculations that will still give the same answer if you swapped the two numbers cards.

1 mark

	Requirement	Mark	Additional guidance
Q1	14 ÷ 2 = 7 8 × 2 = 16 **ONE** mark awarded for **BOTH** number sentences completed correctly.	1	
Q2	300	1	
Q3	9 × 10 and 3 × 5 should be ticked.	1	

Q1 Molly arranges some counters to make an array.

She uses it to represent a multiplication fact and a division fact.
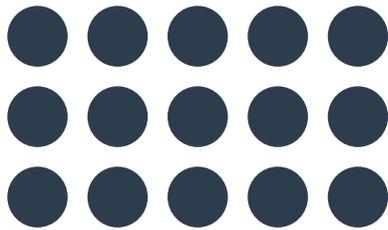
Write two facts that the array shows.

	×		=	

	÷		=	

1 mark

Q2 Bilal uses the same three digit cards to make two numbers.

He marks the numbers on a number line.

300   400   500

What are Bilal's two numbers?

A = ☐

B = ☐

1 mark

Q3 Each of these shapes represents a different whole number.

◯ × ◇ is the same as ◇ × ◯

☆ ÷ △ is the same as △ ÷ ☆

Circle the word true or false in each sentence below and complete the statements.

The first statement is true/false because

_____

_____ .

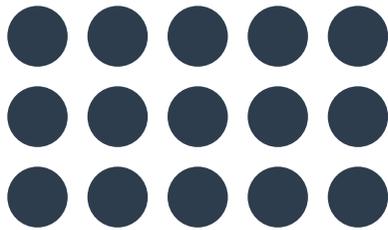The second statement is true/false because

_____

_____ .

1 mark

Q1 Molly arranges some counters to make an array.

She uses it to represent a multiplication fact and a division fact.

Write two facts that the array shows.

| 3 | × | 5 | = | 15 |

| 15 | ÷ | 3 | = | 5 |

1 mark

Q2 Bilal uses the same three digit cards to make two numbers.

He marks the numbers on a number line.

What are Bilal's two numbers?

A = 354

B = 435

1 mark

Q3 **Each of these shapes represents a different whole number.**

⬤ × ◆ is the same as ◆ × ⬤

✦ ÷ ▲ is the same as ▲ ÷ ✦

Circle the word true or false in each sentence below and complete the statements.

The first statement is **true**/false because

See mark scheme for examples

_____ .

The second statement is true/**false** because

See mark scheme for examples

_____ .

1 mark

	Requirement	Mark	Additional guidance
Q1	3 × 5 = 15 **OR** 5 × 3 = 15 15 ÷ 3 = 5 **OR** 15 ÷ 5 = 3 **ONE** mark awarded for **BOTH** a correct multiplication and division fact.	1	
Q2	A = 354 B = 435 **ONE** mark awarded for **BOTH** correct numbers.	1	
Q3	The first statement is **TRUE**. The second statement is **FALSE**. Explanations should mention the fact that multiplications will give the same answer even if the numbers are multiplied in a different order.	1	**BOTH** TRUE/FALSE statements should be identified correctly and appropriate explanations given. Explanations should make mention of the fact that multiplication calculations can be calculated in different orders and still give the same amount (commutative law) and that this is not true of division calculations. Children may choose to give examples to illustrate these. The general aim of this pure reasoning question is to get children to consider the commutativity of multiplication calculations (and the non-commutativity of division calculations).

Q1 Alex, Ben and Chloe are putting plastic counters on a hundred square.

A) 390 + 100   C) 641 – 100

B) 735 + 10   D) 203 – 10

Most digits will change in calculation ☐

because
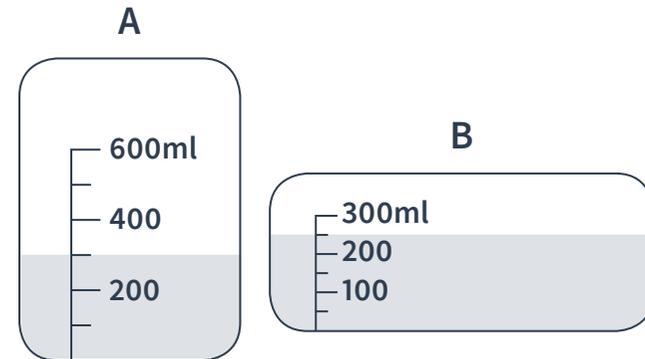
_____

_____

_____
1 mark

Q2 The lift in a skyscraper counts in 8s from zero.

It only stops at floor numbers that are multiples of 8.

● ●
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Which floors does the lift stop at?

_____

_____
1 mark

Q3 Two containers of water are shown below.

A

- 600ml
- 400
- 200

B

- 300ml
- 200
- 100

How much water is in each container?

A = ☐

B = ☐

_____
1 mark

Q1 Alex, Ben and Chloe are putting plastic counters on a hundred square.

A)   390 + 100   C)   641 – 100

B)   735 + 10   D)   203 – 10

Most digits will change in calculation   **10**

because _____

_____

1 mark

Q2 The lift in a skyscraper counts in 8s from zero.
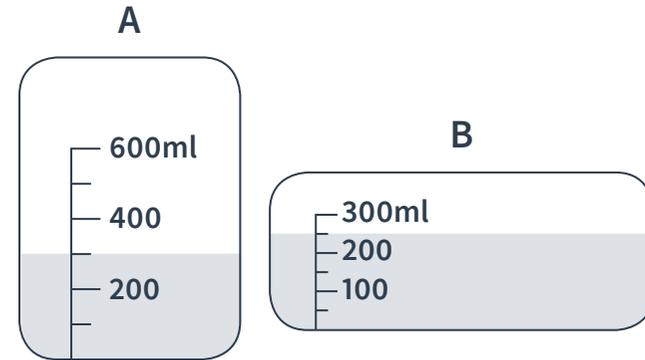
It only stops at floor numbers that are multiples of 8.

● ●
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Which floors does the lift stop at?

8, 16 and 24

1 mark

Q3 Two containers of water are shown below.

A

600ml

400

200

B

300ml

200

100

How much water is in each container?

A = **300ml**

B = **250ml**

1 mark

	Requirement	Mark	Additional guidance
Q1	10	1	
Q2	8, 16 and 24	1	**ALL** three numbers needed for the mark.
Q3	A = 300 ml B = 250 ml	1	**BOTH** answers needed for the mark.

What are examiners looking for?

Q2 The lift in a skyscraper counts in 8s from zero.

It only stops at floor numbers that are multiples of 8.

● ●
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Which floors does the lift stop at?

8, 16 and 24

_____
1 mark

Why are we asking this question?

This question has been written to assess children's ability to count forwards from 0 in multiples of different numbers. In Year 3, this sort of counting is extended to include counting in multiples of 4, 8, 50 and 100, and this particular question tests whether they can do so in jumps of eight.

What common errors do we expect to see?

Some children may count every eight notches along the number line, rather than jumps of eight. Where children have made this mistake, we would expect to see them count eight separate numbers *starting with zero* and give the answers 7, 15 and 23. The error they have made is not to consider the jumps involved (from 0 to 1 is counted as 1 and so on). Children with a stronger grasp of multiples will not even need to do this and will be able to identify multiples of eight through their knowledge of times tables.

Some children may think that a multiple of eight is a number that ends in an eight. Where they have made this error, we would see them give an answer of 8 and 18. These children either lack understanding of what is meant by a 'multiple' of a number or have applied some of the common patterns (all multiples of 10 end in a 0, some multiples of 5 end in a 5).

How to encourage children to solve this question

It is obviously important that children are able to identify multiples of eight mentally. However, for those children who find this difficult, the illustration will prove beneficial. Encourage them to treat it as a number line and draw jumps of 8, circling each multiple of 8 that they reach. If a larger number line is provided, children may choose to physically move a plastic counter.

Hundred squares may be useful in helping children to count in eights if they understand the relationship between counting in eights and + 10 then −2 (moving one square down then two squares to the left).

Q1 A frog jumps along a number line in multiples of 100, starting from 0.

Circle the numbers that the frog will land on.

400   250   1000   900

_____
1 mark

Q2 a) How many days are there in 10 weeks?

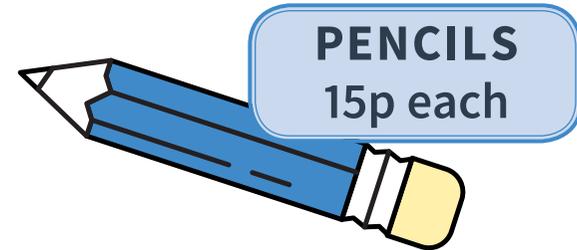b) Five children share 20 football stickers equally. How many stickers do they have each?

Write two number sentences to show how you would work out the answers to these questions.

Number sentence a):

_____

_____

Number sentence b):

_____

_____

_____

_____
2 marks

Q3 Dylan buys two pencils.

He pays with a 50p coin.

**PENCILS
15p each**

How much change will Dylan get?

_____
1 mark

Q1 A frog jumps along a number line in multiples of 100, starting from 0.

Circle the numbers that the frog will land on.

(400)   250   **(1000)**   **(900)**

1 mark

Q2
a) How many days are there in 10 weeks?

b) Five children share 20 football stickers equally. How many stickers do they have each?

Write two number sentences to show how you would work out the answers to these questions.
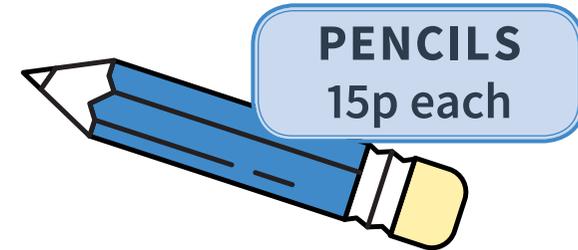
Number sentence a):

10 × 7 = 70

Number sentence b):

20 ÷ 5 = 4

2 marks

Q3 Dylan buys two pencils.

He pays with a 50p coin.

**PENCILS
15p each**

How much change will Dylan get?

20p

1 mark

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	Requirement	Mark	Additional guidance
Q1	**400, 1000 and 900**	1	**Numbers may be given in any order, but ALL three must be present to achieve the mark.**
Q2	**Number sentence** a) 10 × 7 = 70 or 7 × 10 = 70 b) 20 ÷ 5 = 4 **ONE mark awarded for each correct number sentence.**	2	
Q3	**20p**	1	**Note that units don't need to be provided but do NOT accept £20, £20p, or 0.20.**
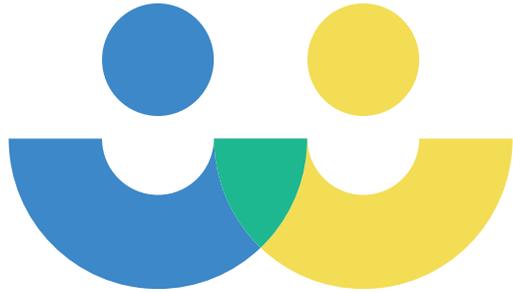
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