THIRD SPACE
LEARNING

Specialist 1-to-1 maths interventions and curriculum resources

Rapid Reasoning

Year 3 | Week 4

This week, the new Year 3 objectives that are introduced in focus on **addition and subtraction**.

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

- adding and subtracting numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds.

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

- addition and subtraction of up to three digits, where place value boundaries are not crossed.

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 This function machine adds 40 to three-digit numbers.

IN ➡ **+ 40** ➡ **OUT**

Complete these sentences.
Use the words **always**, **sometimes**, or **never**.

The ones digit in each three-digit number will _____ change.

The hundreds digit in each three-digit number will _____ change.

2 marks

Q2 Arrange these cards to make two three-digit numbers.

Only use each card once.

six   and twenty

one hundred   and fifty

nine   three hundred

Write your answers **in numbers**.

[   ]   [   ]

1 mark

Q3

×	2	5
7		
10		

Write **two** number sentences to work out the missing numbers in this multiplication table.

☐ × ☐ = ☐

☐ × ☐ = ☐

1 mark

Q1 This function machine adds 40 to three-digit numbers.

IN ➡ **+ 40** ➡ **OUT**

Complete these sentences.

Use the words **always, sometimes,** or **never.**

The ones digit in each three-digit number will ___**never**___ change.

The hundreds digit in each three-digit number will **sometimes** change.

2 marks

Q2 Arrange these cards to make two three-digit numbers.

Only use each card once.

[six] [and twenty]

[one hundred] [and fifty]

[nine] [three hundred]

Write your answers **in numbers.**

| **100** | **300** |

1 mark

Q3

×	2	5
7		
10		

Write **two** number sentences to work out the missing numbers in this multiplication table.

7	×	5	=	35
10	×	2	=	20

1 mark

	Requirement	Mark	Additional guidance
Q1	never sometimes **ONE** mark awarded for each correct answer.	2	
Q2	Any **two** numbers from: 100, 120, 126, 129, 150, 156, 159, 300, 320, 326, 329, 350, 356, 369 **ONE** mark awarded for two different numbers.	1	
Q3	7 × 5 = 35 **OR** 5 × 7 = 35 10 × 2 = 20 **OR** 2 × 10 = 20 **ONE** mark awarded for both correct number sentences.	1	

What are examiners looking for?

Q1 **This function machine adds 40 to three-digit numbers.**

IN ➡ **+ 40** ➡ **OUT**

Complete these sentences.

Use the words always, sometimes, or never.

The ones digit in each three-digit number will **never** **change.**

The hundreds digit in each three-digit number will sometimes change.

2 marks

Why are we asking this question?

This question is designed to assess whether children can mentally add multiples of 10 to three-digit numbers. In particular, it tests whether they recognise the effect that doing so can have on the three digits.

What common errors do we expect to see?

Some children may reason that adding a two-digit number to a three-digit number will affect the ones digits (despite the fact that the ones digit being added is a zero). These children will give the answer **always** for the first part of the question.

Some children may reason that, because the number being added has only two digits, the hundreds digit in the three-digit number will remain unchanged. These children will give the answer **never** for the second part of the question.

How to encourage children to solve this question

Challenge children to try some quick examples of their own, perhaps imagining that the three-digit number is made of digit cards. Which digit cards will they need to change? Which remain the same?

Encourage children to consider numbers that will result in crossing the hundreds boundary (i.e. what happens if the tens digit in the three-digit number equals 60, 70, 80 or 90?).

Some children may find it useful to represent each addition using base ten concepts so that they recognise the need to exchange ten 10s for one 100 if the hundreds boundary is crossed. Children may benefit from sketching this. For example:
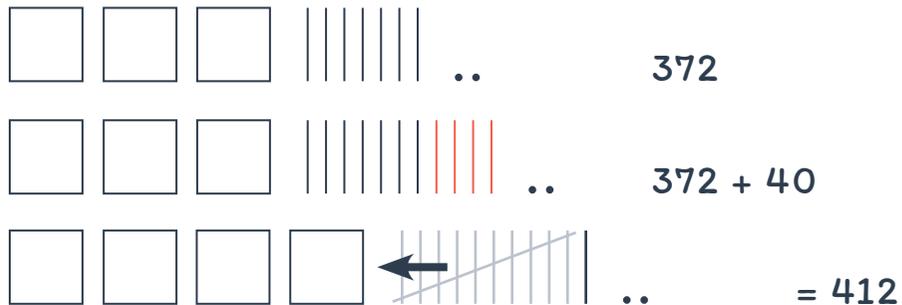
It is important that children recognise that the presence of a 0 in the ones place will always mean that the ones digit remains the same and the effect of adding four tens can vary, depending on the tens digit in the larger number.

372 + 40

Q1 Ryan says, "The answers to 2, 5 and 10 times tables questions are always even numbers."

Is Ryan correct? Circle your answer:

Yes / No

Explain your answer.
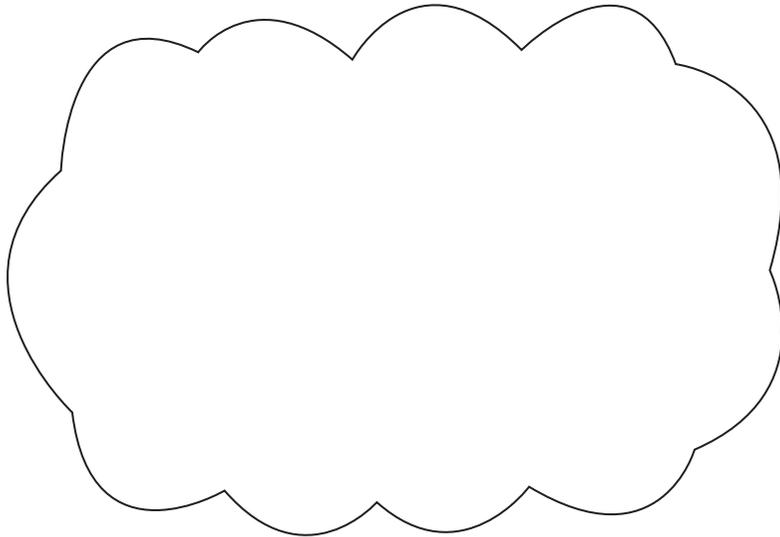
1 mark

Q2 Complete this sequence of numbers.

0, ☐ , 8, ☐ , ☐ , 20, 24

2 marks

Q3

Marbles

£2.50

Stickers

£3.00

Robot

£4.00

Bouncy ball

£1.00

Peter visits a toy shop.

He spends £7.50 exactly.

The shop only has one of each toy in stock.

Which toys does Peter buy?

_____

_____

1 mark

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Q1 Ryan says, "The answers to 2, 5 and 10 times tables questions are always even numbers."

Is Ryan correct? Circle your answer:

Yes / (No)

Explain your answer.

See mark scheme for examples

1 mark

Q2 Complete this sequence of numbers.

0, **4** , 8, **12** , **16** , 20, 24

2 marks

Q3

Marbles
£2.50

Stickers
£3.00

Robot
£4.00

Bouncy ball
£1.00

Peter visits a toy shop.

He spends £7.50 exactly.

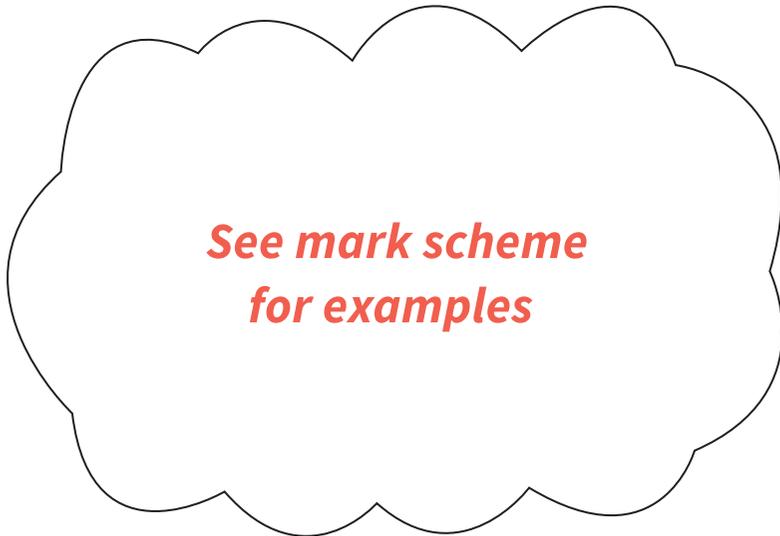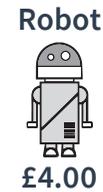The shop only has one of each toy in stock.

Which toys does Peter buy?

Robot, bouncy ball and marbles.

1 mark

	Requirement	Mark	Additional guidance
Q1	No Explanation should include the fact that, although multiples of two and 10 are always even, every other multiple of five is odd. Award **ONE** mark for correct answer **AND** explanation.	1	
Q2	4, 12, 16 **ONE** mark for two correct numbers. **TWO** marks for all correct numbers.	2	
Q3	Robot, bouncy ball and marbles.	1	Accept answers given in a different order.

Q1 This machine subtracts 200.

741 →
309 →
− 200
→ A
→ B

If 741 and 309 go into the machine, which two numbers come out?

A = [   ]   B = [   ]

_____
1 mark

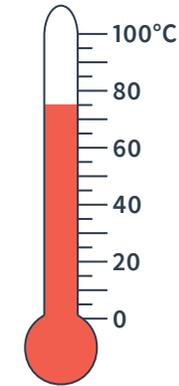**Q2** Mrs Williams writes out a vertical addition for her class.

She covers up the answer with a sticker.

```
  416
+ 302
_____
```

What number has she covered up?

[   ]

_____
1 mark

Q3 This thermometer shows the temperature of some hot water.
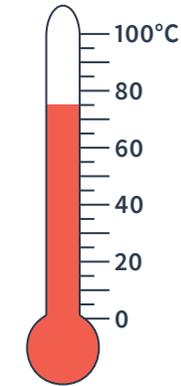
What is the temperature of the water?

[   ] °C

_____
1 mark

Q1 This machine subtracts 200.

741 → -200 → A

309 → → B

If 741 and 309 go into the machine, which two numbers come out?

A = **541**   B = **109**

_____
1 mark

Q2 Mrs Williams writes out a vertical addition for her class.

She covers up the answer with a sticker.

$$416$$
$$+\ 302$$

What number has she covered up?

718

_____
1 mark

Q3 This thermometer shows the temperature of some hot water.

100°C
80
60
40
20
0

What is the temperature of the water?

75 °C

_____
1 mark

	Requirement	Mark	Additional guidance
Q1	A = 541, B = 109 **ONE** mark awarded for **BOTH** numbers.	1	
Q2	718	1	
Q3	75°C	1	

Q1 Show how you can find the difference between 416 and 302 using column subtraction.

1 mark

Q2 Mo is counting from 0 in jumps of 8.
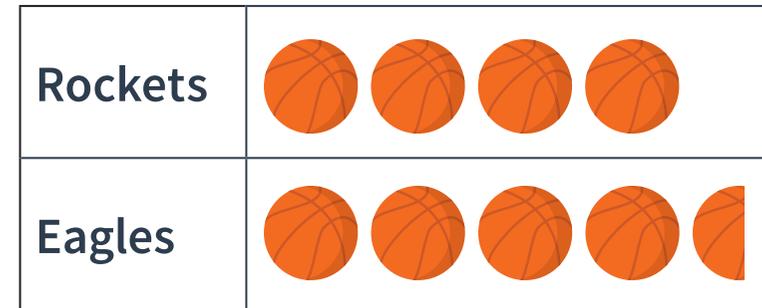
He says the number 52.

Has Mo counted correctly? Circle your answer: Yes / No

Explain your answer.

1 mark

Q3 This pictogram shows the number of baskets scored by two basketball teams.

| Rockets | 🏀 🏀 🏀 🏀 |
| Eagles | 🏀 🏀 🏀 🏀 🏀 |

🏀 = 2 baskets

How many baskets does each team score?

Rockets = [ ] baskets

Eagles = [ ] baskets

1 mark

Q1 Show how you can find the difference between 416 and 302 using column subtraction.

					114				

1 mark

Q2 Mo is counting from 0 in jumps of 8.

He says the number 52.

Has Mo counted correctly? Circle your answer: Yes / No

Explain your answer.

See mark scheme for examples

1 mark

Q3 This pictogram shows the number of baskets scored by two basketball teams.

🏀 = 2 baskets

How many baskets does each team score?

Rockets = **8** baskets

Eagles = **9** baskets

1 mark

	Requirement	Mark	Additional guidance
Q1	114	1	
Q2	No Explanation should mention the fact that 52 is not a multiple of 8 (the only number in the 50s that Mo will say is 56). Award **ONE** mark for correct answer **AND** explanation.	1	
Q3	8 baskets 9 baskets	1	**BOTH** answers must be correct to achieve the mark.

Q1 Three calculations are shown below.

A	B	C
416	897	653
+ 302	− 120	+ 214

☐ ☐ ☐

Tick **two** calculations that give the same answer.

_____
1 mark

Q2 473 + 30   288 + 40   159 + 30   50 + 362

Which of these calculations is the odd one out? Why?

2 marks

Q3 Here are the prices of ice cream flavours per scoop.

Raspberry Ripple	25p
Mint Choc Chip	32p
Fudge Swirl	36p
Vanilla	10p

Kiera spends 67p.

The scoops she chooses are all different.

Which flavour scoops does Kiera choose?

1 mark

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Q1 Three calculations are shown below.

A	B	C
416	897	653
+ 302	− 120	+ 214

☑ ☑ ☐

Tick **two** calculations that give the same answer.

1 mark

Q2 473 + 30   288 + 40   159 + 30   50 + 362

Which of these calculations is the odd one out? Why?

159 + 30

See mark scheme for example

2 marks

Q3 Here are the prices of ice cream flavours per scoop.

| Raspberry Ripple	25p
Mint Choc Chip	32p
Fudge Swirl	36p
Vanilla	10p

Kiera spends 67p.

The scoops she chooses are all different.

Which flavour scoops does Kiera choose?

Raspberry Ripple, Mint Choc Chip and Vanilla.

1 mark

	Requirement	Mark	Additional guidance
Q1	A and B ticked.	1	Accept other ways of indicating A and B as the correct answers.
Q2	159 + 30 is the odd one out because all the other calculations cross over the hundreds boundary and this calculation does not. (Other answers are possible.)	2	The aim of this pure reasoning question is for children to recognise that three of the four calculations cross over the hundreds boundary. So, in three of the four calculations, two digits will change in the answer. In 159 + 30, only one digit will change as it does not cross over into the next hundred.
Q3	Raspberry Ripple, Mint Choc Chip and Vanilla.	1	Flavours may be written in a different order.
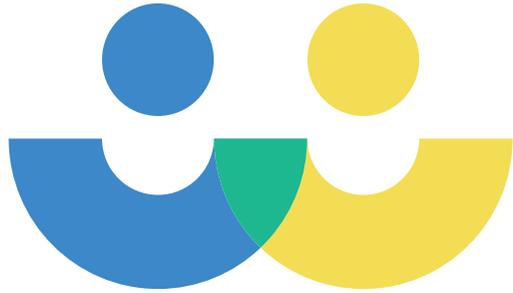
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Rapid Reasoning

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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