KS1 Reasoning & Problem Solving Questions

MathsHUBS
White Rose

Reasoning and Problem Solving Questions

KS1

Information

This booklet contains over 40 reasoning and problem solving questions suitable for KS1 classes. These are the questions that we have been putting out each day in March 2016 on Twitter in the run up to SATS.

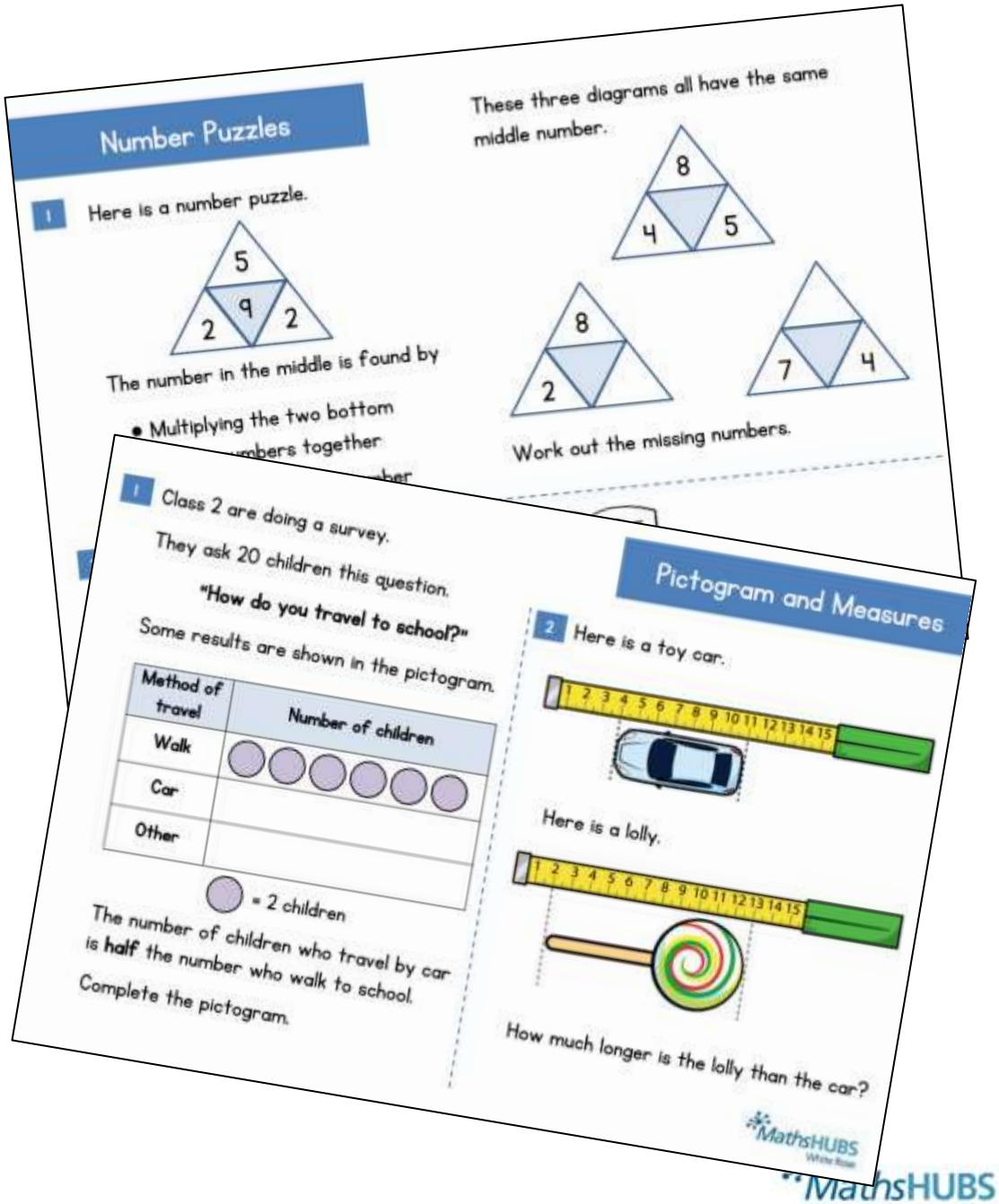
The answers are provided with some simple notes at the back of the booklet and for some questions supplementary questions and variation has been provided.

We hope to release more questions like this over the course of next year including some open ended problems. Please keep a look out for our work. If you have not seen our schemes and assessments for primary then please take a look at our website www.whiterosemathshub.co.uk

As always we welcome any feedback on the work we are doing and the materials that we are releasing.

Thank you for taking an interest in our work.

The White Rose Maths Hub Team



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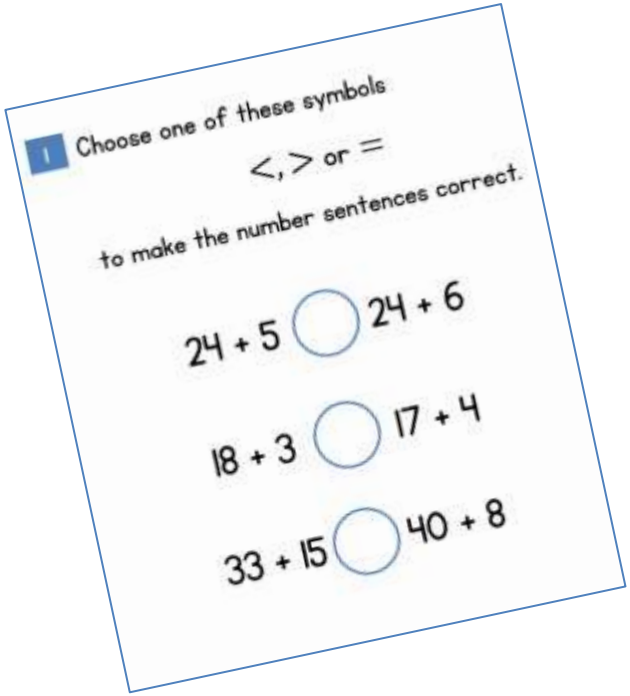
Children's Reponses

Children's responses will tell you a lot about their depth of understanding of a given topic. For example

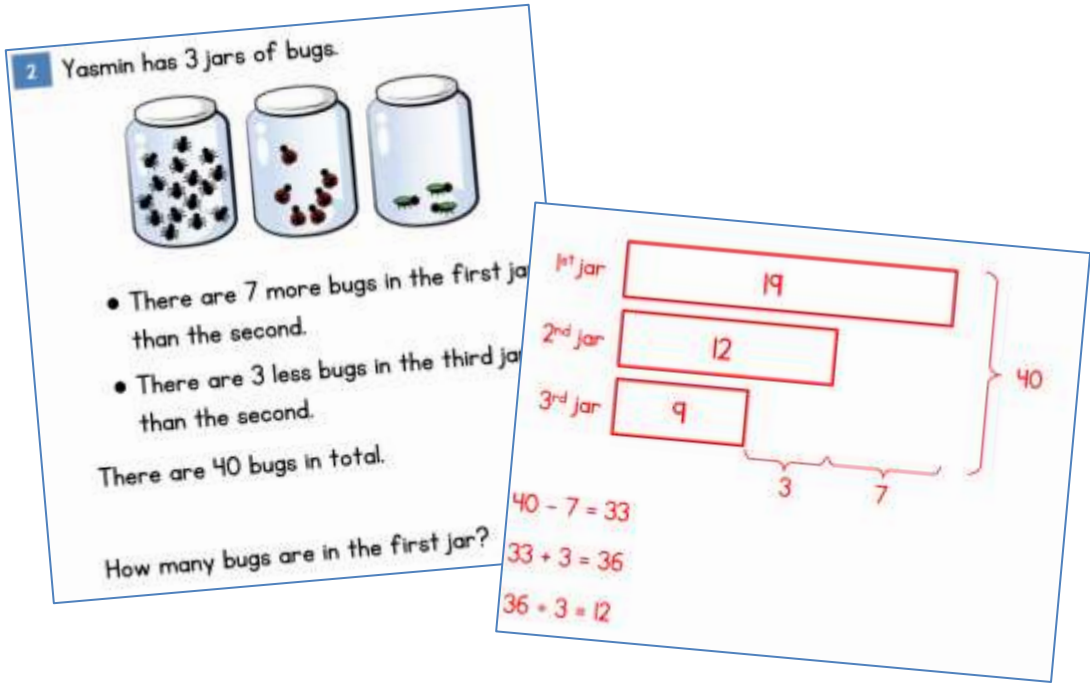


Children who reason verbally or written that 5 is less than 6 and then 24 is being added each time potentially indicate a deeper understanding of number than those who work out both sides of the inequality.

Bar Modelling – Pictorial Methods

Many of the problem solving questions in this booklet can be solved using a bar modelling method. Encourage children to use diagrams to help them solve the problem.

Here is a problem where bar modelling would help.



If you want to find out more about bar modelling please contact the Hub.

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Stickers and Squares

1 Razza and Gina have the same number of stickers.

- Razza gives 15 stickers away.
- Gina gives 32 stickers away.

How many more stickers than Gina does Razza have now?

2 Here is part of a number square.

5	6	7	8	9
15	16	17		
25				

Add together the two numbers that would be in the shaded squares.

Calculations

1 Choose one of these symbols

$<$, $>$ or $=$

to make the number sentences correct.

$24 + 5 \bigcirc 24 + 6$

$18 + 3 \bigcirc 17 + 4$

$33 + 15 \bigcirc 40 + 8$

2 Put the numbers 6, 7, 8, 9, 10 and 11 into the boxes.

Use each number only once.

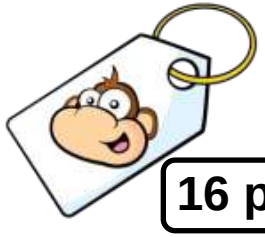
$23 + 10 + \square > 23 + 10 + \square$

$32 + \square + 5 < 32 + \square + 5$

$50 + 30 + \square = 49 + 29 + \square$

Presents

1 Mary buys these two items.



16 pence

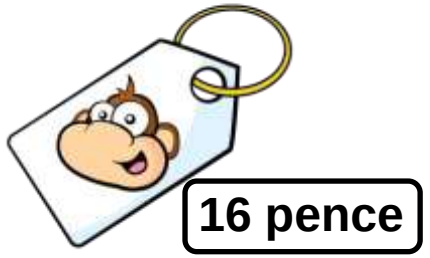
19 pence

She pays with the following coin.

Here is the change she is given.

Has she been given the correct change?

2 Mo buys a key ring.



16 pence

His mum gives him a quarter of the money.

How much money does he have to pay himself?

Number Problems

1 If

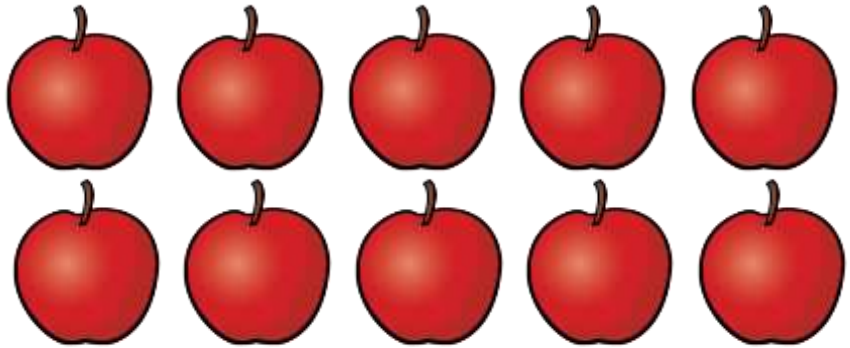
□ + □ + □ = 18

○ + ○ = 18

Work out

□ + ○

2 Here are some apples.



Class 2 are asked work out the total.

Here are four different ways they do it.

Fill in the missing blanks.

..... + ... = 10

..... + ... + ... + ... + ... = 10

..... × ..... = 10

..... × ..... = 10

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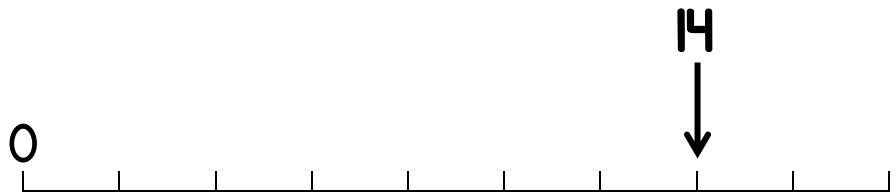
Number Problems

1 Here is a number line.

The number 14 is shown.

Mark the number 9 on the number line.



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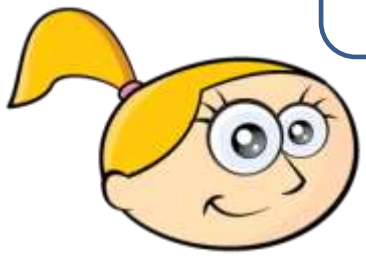
2 Here are some digit cards.

Meg and Sam each use two of the cards to make a number.

What is the difference between their two numbers?

I have made the largest number you can make.



I have made the smallest number you can make.

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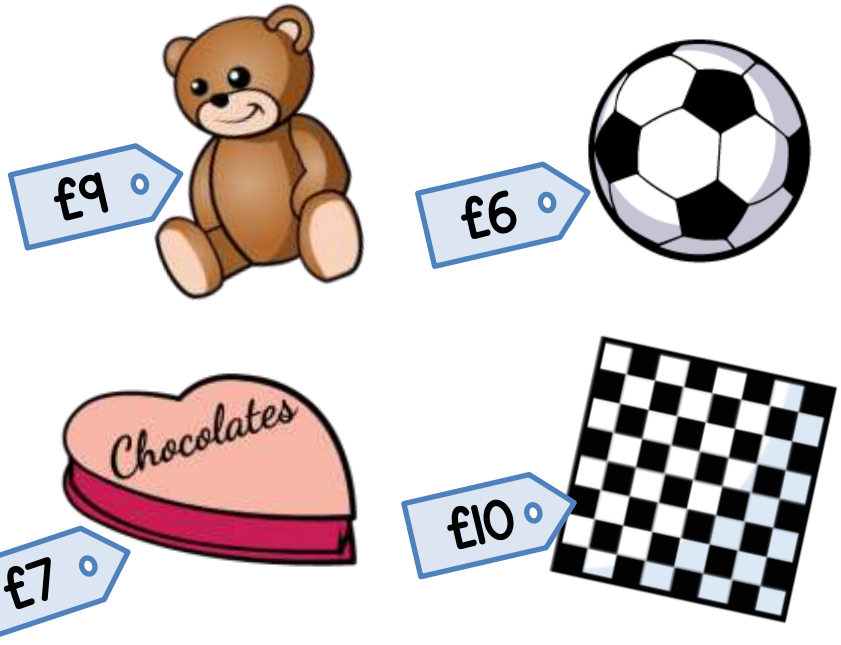
Shopping and Baking

1 These items are sold in a shop.



Ray buys three items.

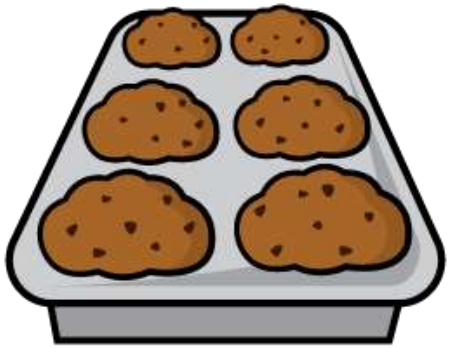
Two of them were the same item.

He spent £23

Which items does he buy?

2 Erik bakes 5 trays of muffins.

Each tray contains 6 muffins.



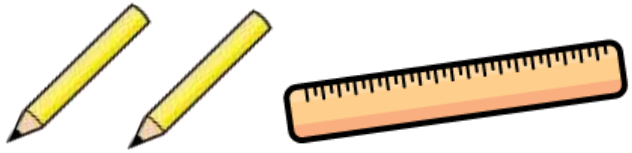
He sells 16 muffins and eats 5

How many muffins does he have left?

More Number Problems

1 Mike buys these items and it costs him 30 pence.

Olga buys these items and it costs her 42 pence.

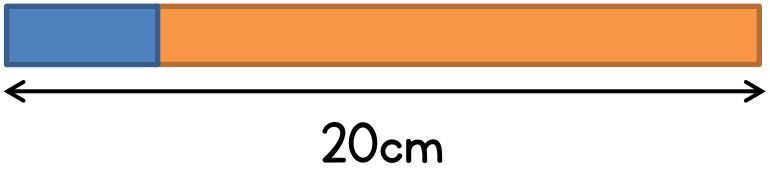


How much does a ruler cost?

2 Here is a blue strip of paper.

An orange strip of paper is four times as long.

The strips are joined end to end.

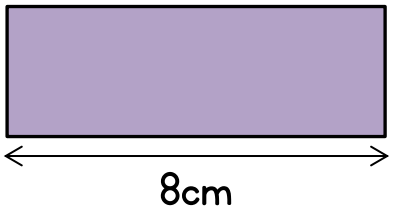


How long is the blue strip?

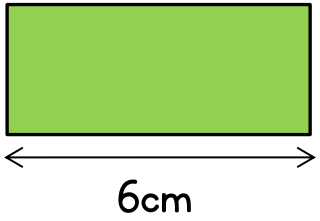
How long is the orange strip?

Problems Galore

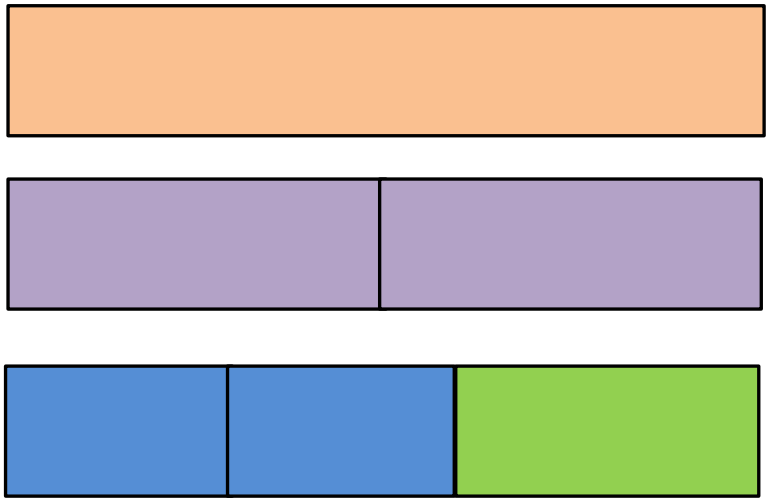
1 Each purple block is 8cm long.



Each green block is 6cm long.



How long is a blue block?



2 Aron has some balloons.

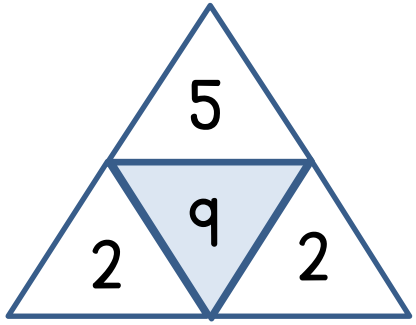
Fiona has 12 more balloons than Aron.

In total they have 40 balloons.

How many balloons has Fiona got?

Number Puzzles

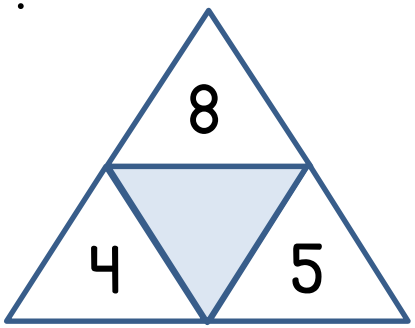
1 Here is a number puzzle.

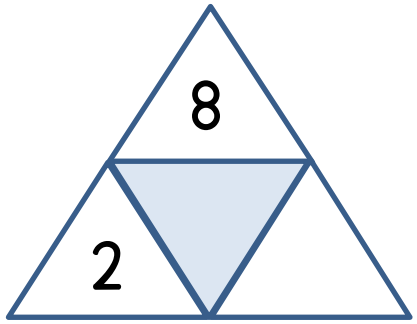


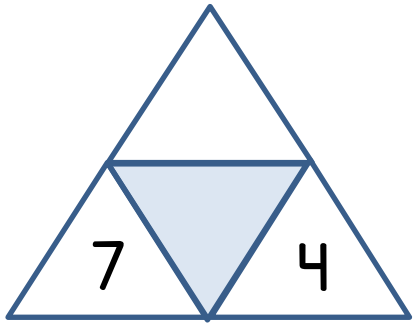
The number in the middle is found by

- Multiplying the two bottom corner numbers together
- Then add on the top number

These three diagrams all have the same middle number.

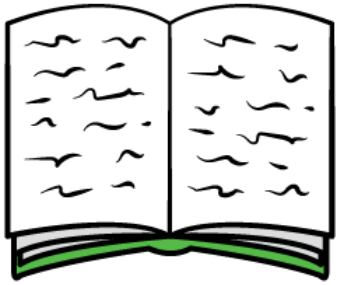






Work out the missing numbers.

2 Jeff is reading a book.



He reads 9 pages.

He has 3 pages left to read.

What fraction of the book does he have left to read?

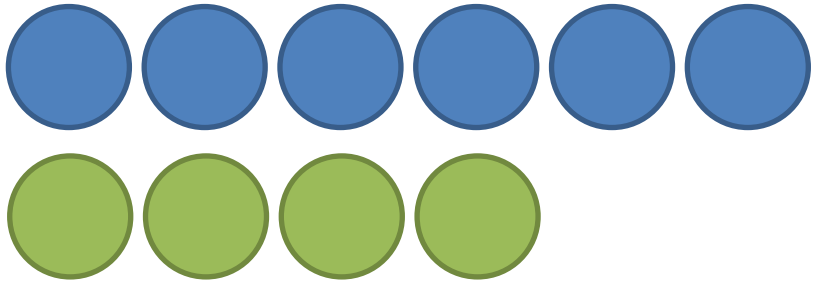
Prizes and Balances

1 Sasha is playing a game to win prizes.

Each blue counter is worth 2 points.

Each green counter is worth 5 points.

She wins the following counters.



Which of these prizes can Sasha get?

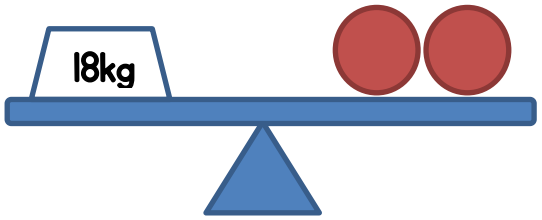
50 points

25 points

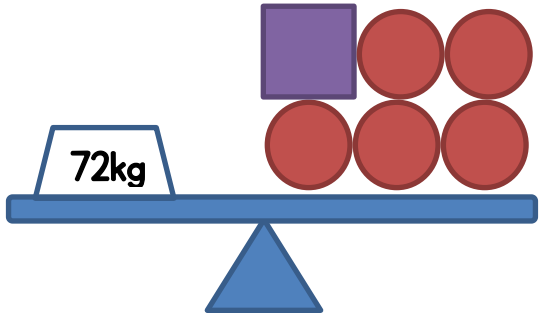
30 points

40 points

2 Here is a balance



Here is another balance



Work out the weight of **two**  s.

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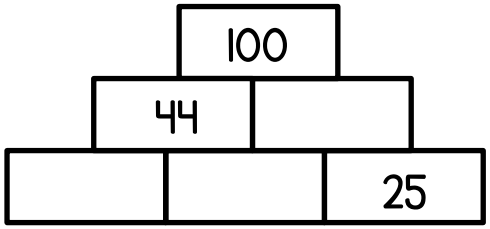
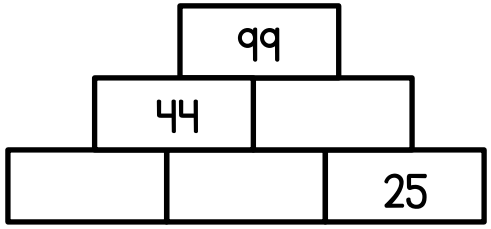
Wednesday Workout

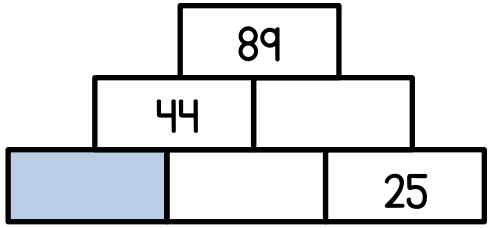
1 In the pyramids the two numbers below add to the make the number above.

Complete these two pyramids.



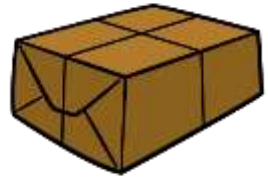


What is the value of the blue box?



How did you get your answer?

2 Marie is posting a letter and parcel.



It costs 29 pence to post the letter.

It costs 15 pence **more** to post the parcel.

Marie pays with this coin.

How much change does she get?

Pictogram and Measures

1 Class 2 are doing a survey.

They ask 20 children this question.

"How do you travel to school?"

Some results are shown in the pictogram.

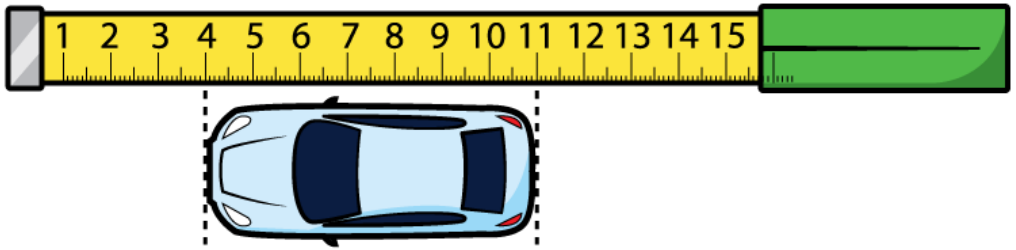
Method of travel	Number of children
Walk	● ● ● ● ● ●
Car	
Other	

● = 2 children

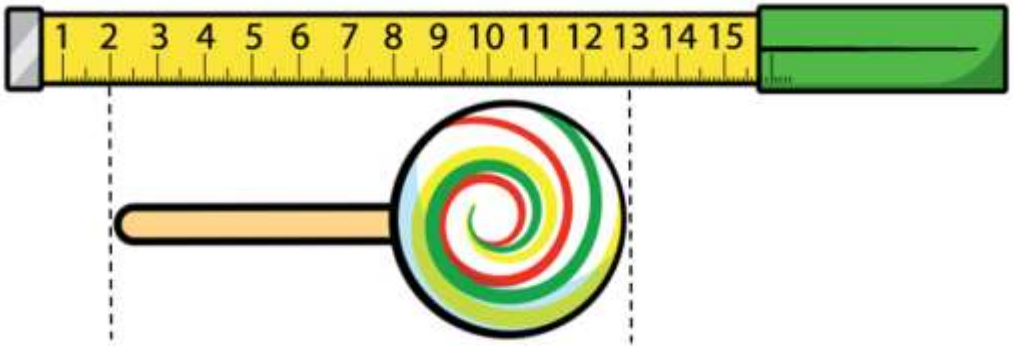
The number of children who travel by car is **half** the number who walk to school.

Complete the pictogram.

2 Here is a toy car.



Here is a lolly.



How much longer is the lolly than the car?

Two wordy problems

For Q2 you might find it helpful to draw a bar model or other diagram.

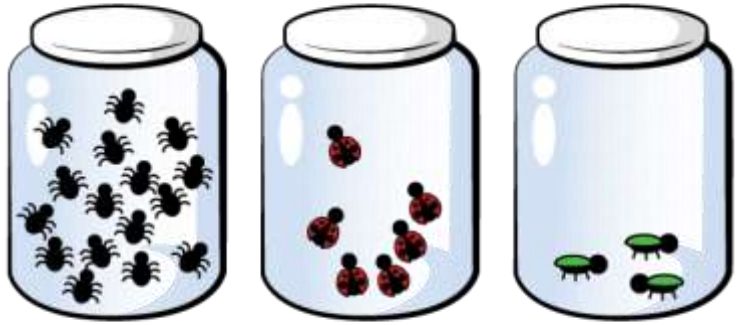
1 Sarah has some 10 pence and 5 pence coins.

She has five 10 pence coins.

Sarah has 85 pence in total.

How many 5 pence coins does she have?

2 Yasmin has 3 jars of bugs.



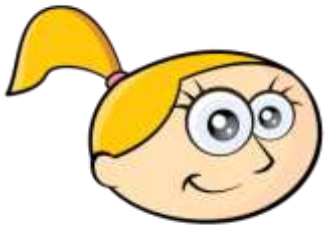
- There are 7 more bugs in the first jar than the second.
- There are 3 less bugs in the third jar than the second.

There are 40 bugs in total.

How many bugs are in the first jar?

Number Problems

1 Sam and Zoe are working out some subtractions.



I am working out 74 - 56

Sam

One of the numbers in my questions is 15

Zoe

Sam's answer is double Zoe's answer.

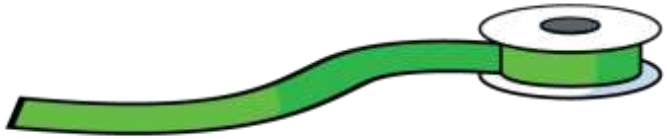
What could Zoe's question be?

2 Mr Drake needs 20 metres of ribbon.

Red ribbon costs £5 per metre.

.

Green ribbon costs £2 per metre.



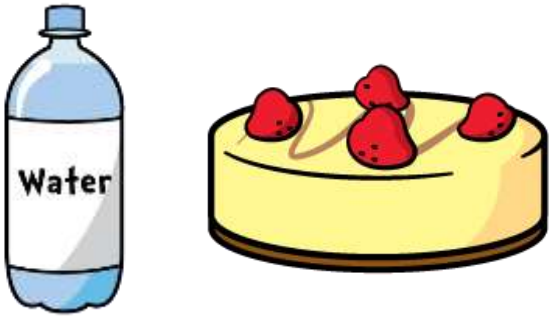
He buys 12 metres of red ribbon.

The rest is green.

How much does he spend in total?

Shopping and Football

1 Mika buys a bottle of water and a cheesecake.



He pays with the following coins.

He receives 18 pence change.

The water costs 29 pence.

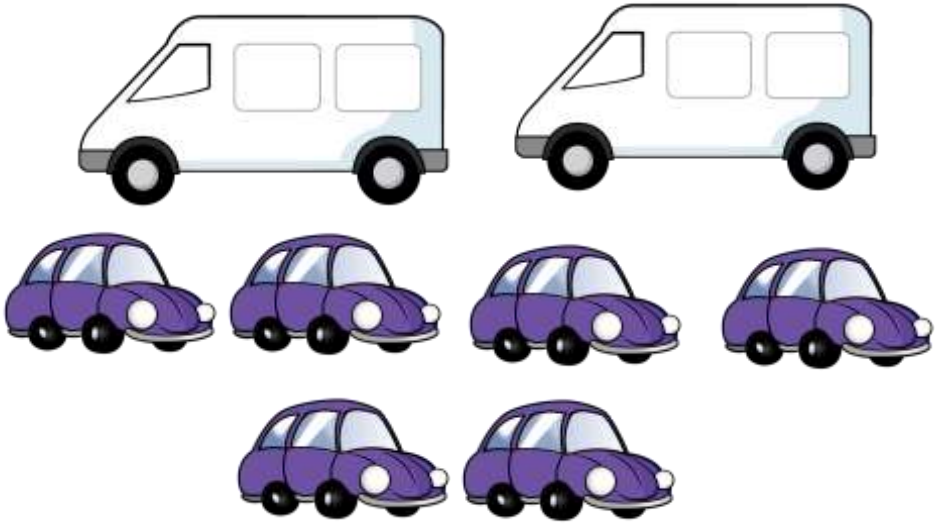
How much does the cheesecake cost?

2 62 people are going to a football game.

They can travel in a bus or car.

- A car can hold 5 people.
- A bus can hold 15 people.

They plan to use 6 cars and 2 buses.



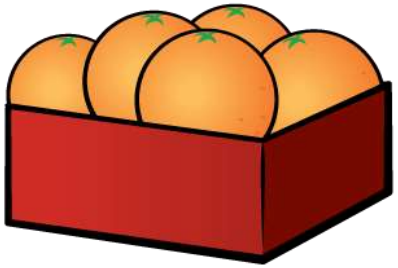
Can they all travel to the game?

Number Problems

1 Des has some oranges.

He packs them into boxes.

Each box holds 5 oranges.



He fills 7 boxes.

He has 29 oranges left.

How many oranges does he have in total?

2 Complete the number sentences.

$5 + 5 + 5 + 5 + 5 + 5 = \square \times 5$

$10 + 5 + 5 + 5 + 5 = \square \times 5$

$10 + 10 + 2 + 2 = \square \times 2$

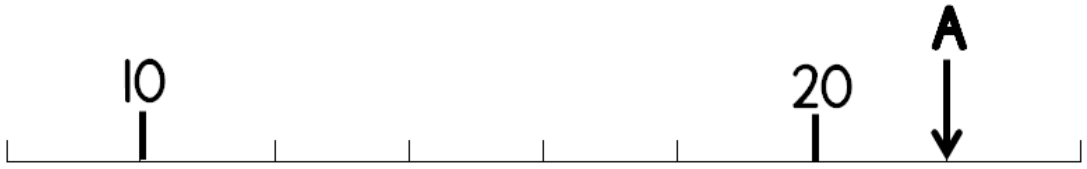
$4 \times 2 + 5 \times 2 = \square \times 2$

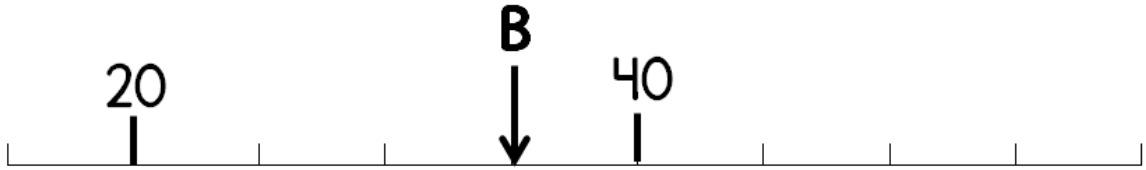
Explain your methods.

Number Problems

1 Here are two number lines.

Find the difference between A and B.

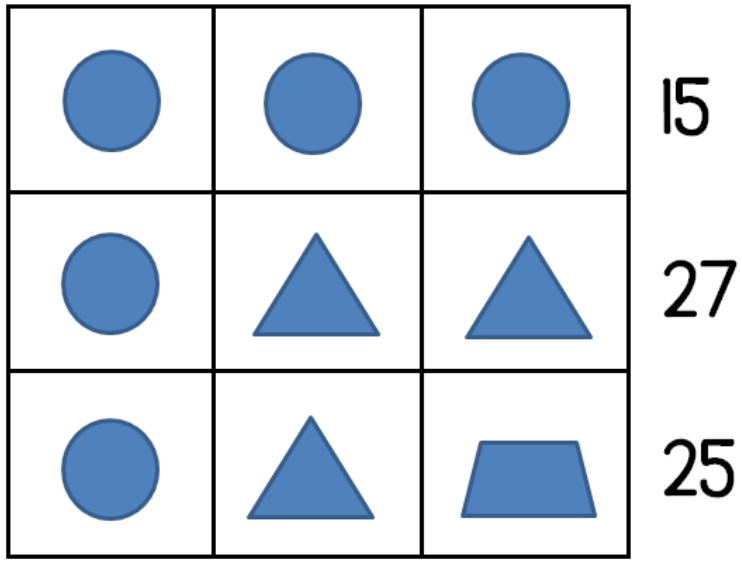




2 In this diagram shapes represent numbers.

The sum of each row is shown at the side.

Find the value of each shape.



Number Problems

1 Here is a number sentence.

$$5 \times \square > 32$$

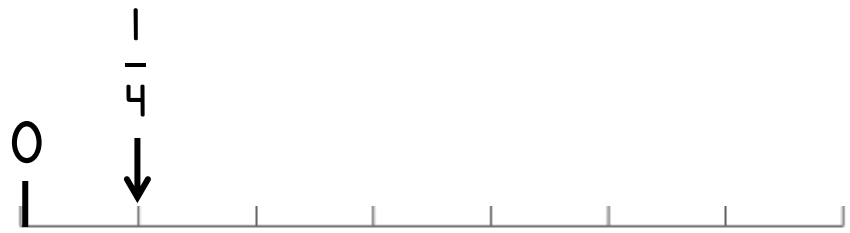
What is the smallest whole number that can be used to make the sentence correct?

2 Here is another number sentence.

$$26 + 15 < 60 - \square$$

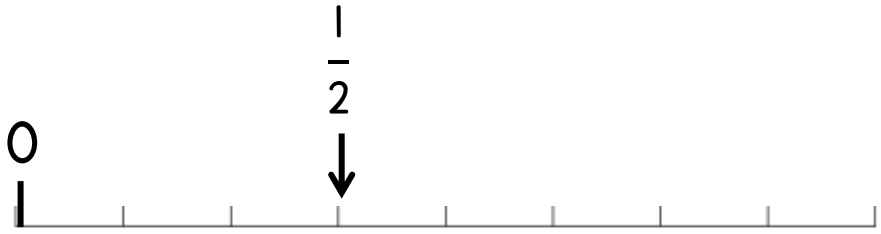
What is the greatest whole number that can be used to make the sentence correct?

3 Here is a number line.



Mark the number 1 on the line.

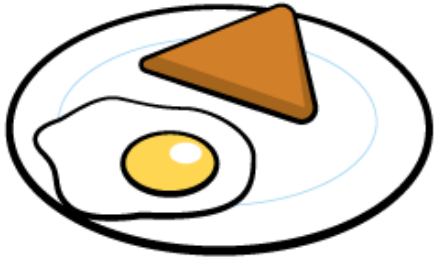
4 Here is a different number line.



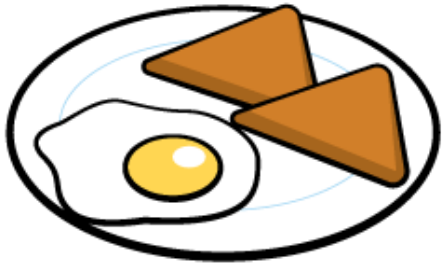
Mark the number 1 on this line.

Breakfast Time

1 One egg and one slice of toast costs 74 pence.

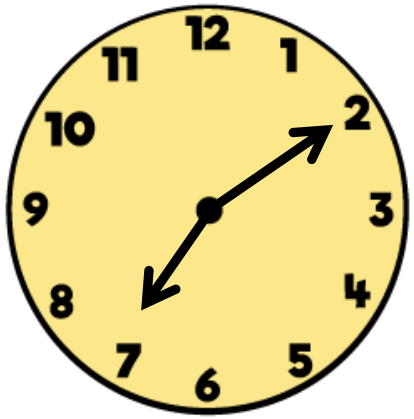


One egg and two slices of toast costs £1



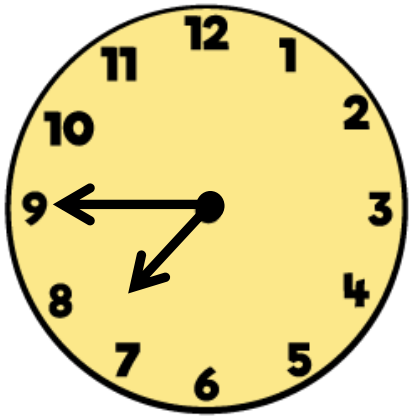
How much does an egg cost?

2 A TV show starts at this time.



The TV show lasts 45 minutes.

Maria looks at the clock during the show.



How many more minutes does the TV show last?

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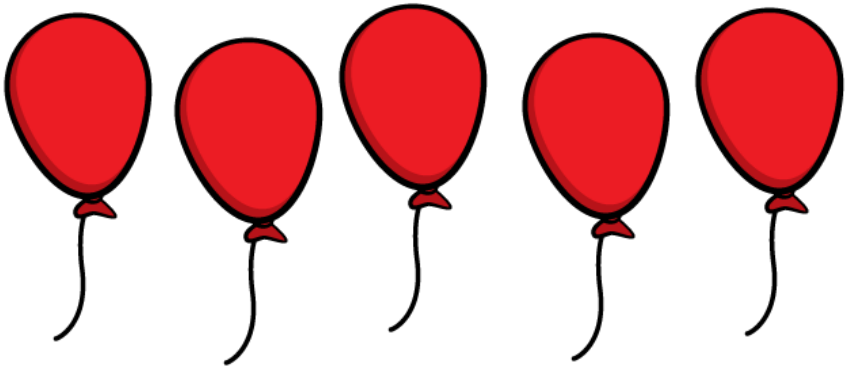
Number Problems

1 Joe has these coins.

Balloons cost 5 pence each.

He buys the following balloons.



How much money does he have left?

2 Emma has 87 Easter eggs.

She has some baskets to fill.

She fills each basket with 10 eggs.

How many baskets did she fill?

How many eggs did she have left?

If each basket held only 5 eggs, how would your answers change?

Reasoning and Problem Solving Questions

KS1

Sheet	Answer	Notes
Stickers and squares	17	
	76	Encourage students to try to answer the problem without filling in all the squares.
Calculations	<, =, =	Encourage students to explain their reasoning without working out each individual calculation.
	11, 10 7, 9 6, 8	Students should start with the last calculation. Various answers available.
Presents	Yes	With working
	12 pence	
Number problems	15	Square = 6 Circle = 9 To extend this students could make a calculation that adds up 24
	5 + 5 2 + 2 + 2 + 2 + 2 2 x 5 5 x 2	

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Reasoning and Problem Solving Questions

KS1

Number problems		
	40	
Shopping and baking	**Two chocolates and one teddy**	**Other questions you could ask:** **If you had £30 what could you buy?**
	9 muffins	
More number problems	**18 pence**	**Ask students how they can work out the cost of one pencil.**
	4 cm **16 cm**	**Split the strip into 5 equal parts**
Problems galore	**5 cm**	**Students may find it useful to mark on the diagram.**
	26 balloons	**A bar model diagram may help students answer this question.**
Number puzzles	**28** **28, 10** **0, 28**	**Can they find any more pyramids that make 28?**
	$\frac{1}{4}$	

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Reasoning and Problem Solving Questions

KS1

Prizes and balances	Football or chew bar	
	54 kg	Circle = 9 Square = 27
Wednesday workout	56, 13, 31 55, 14, 30 45, 24, 20	Can they see a pattern? What happens to the blue box when the number at the top changes?
	27 pence	
Pictogram and measures	3 circles for car 1 circle for other	
	4 cm longer	
Two wordy problems	7	
	19	A bar model diagram may help students answer this question.
Number problems	15 – 6 or 24 – 15	
	£76	This is luxury ribbon!
Shopping and football	33 pence	
	No they will be two people short	With working.
Number problems	64 oranges	
	6 6	With explanations.

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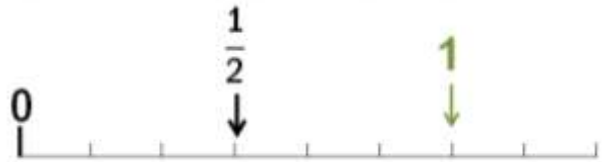
Reasoning and Problem Solving Questions

KS1

	12 **9**	
Number problems	**13**	**A = 22** **B = 35**
	Circle = 5 **Triangle = 11** **Trapezium = 9**	
Number problems	**7**	
	18	
		**Other questions you could ask:** **Where is $\frac{1}{2}$ on the number line?**
		**Other questions you could ask:** **Where is $\frac{1}{4}$ on the number line?** **What is each marker worth?**
Breakfast time	**48 pence**	**Students should work out what one slice of toast costs before working out the price of an egg.**
	10 minutes	

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Reasoning and Problem Solving Questions

KS1

Number problems	**35 pence**	
	8 baskets **7 eggs left** **17 baskets** **2 eggs left**	**Other questions you could ask:** **What if there were 93 eggs?** **What if each basket only held two eggs?**

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