KS1 Reasoning & Problem Solving Questions 2017

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 2017 on Twitter in the run up to SATS.

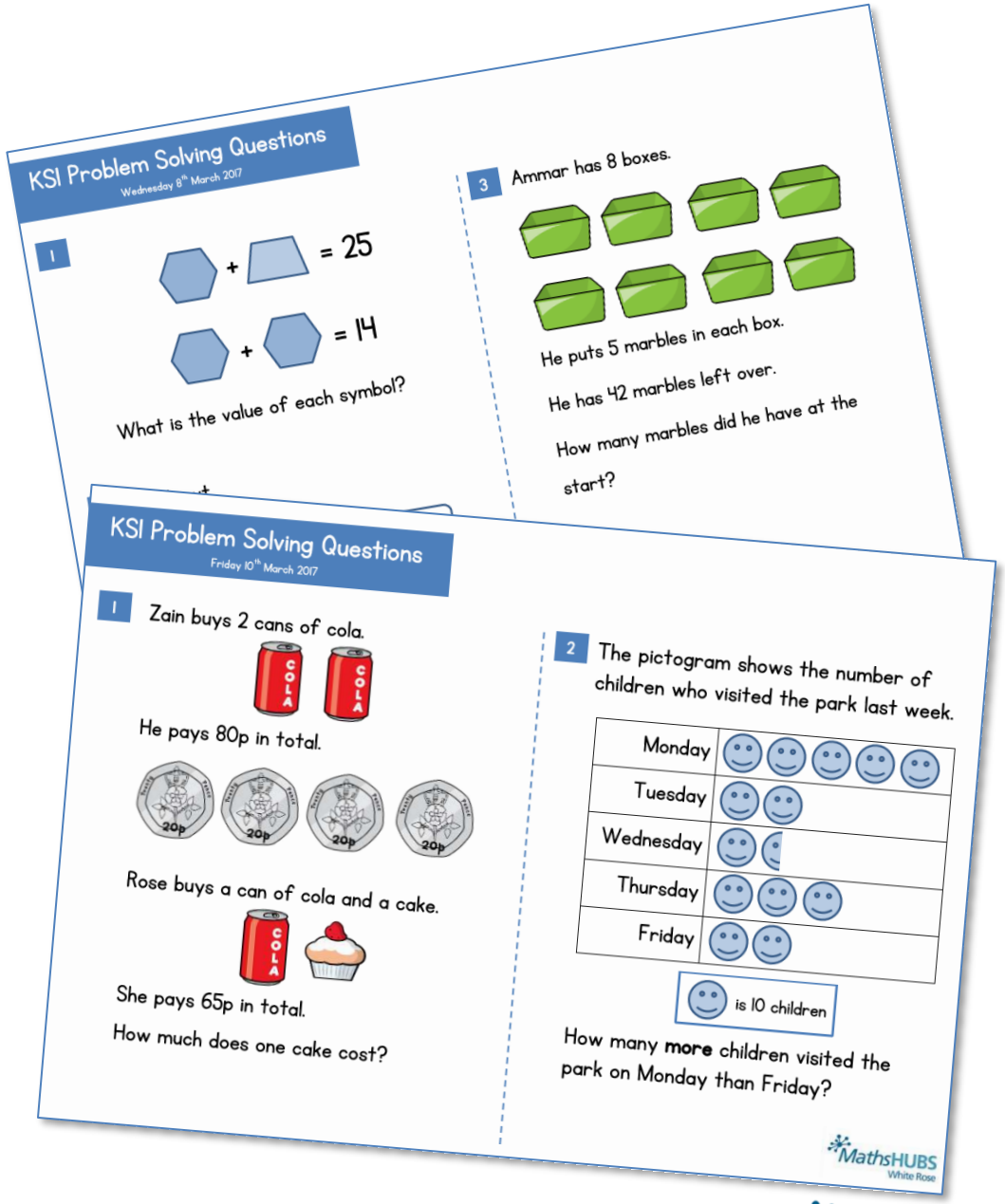
The answers are provided with some simple notes at the back of the booklet and for some questions supplementary questions and variation has been provided.

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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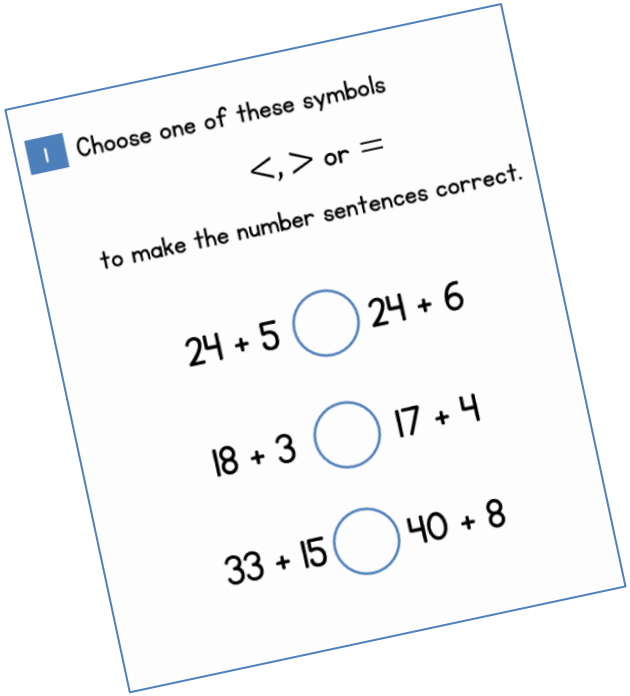
Children's Reponses

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

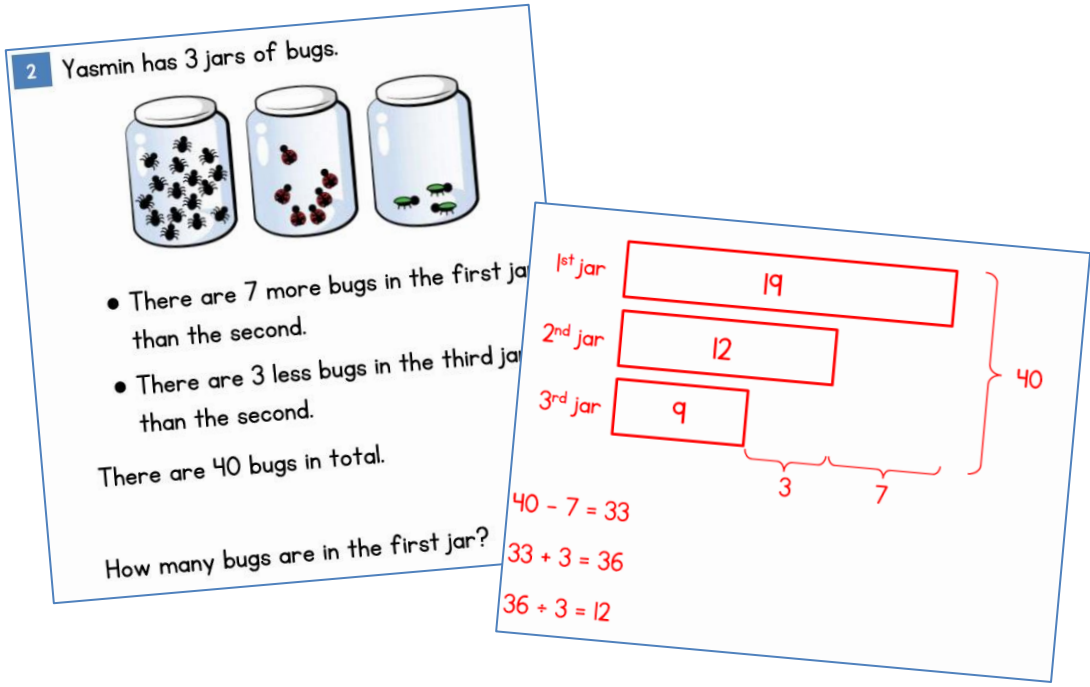


Children who reason verbally or written that 5 is less than 6 and then 24 is being added each time potentially indicate a deeper understanding of number than those who work out both sides of the inequality.

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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KS1 Problem Solving Questions

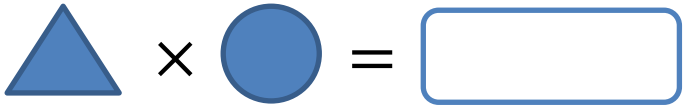
Wednesday 1st March 2017

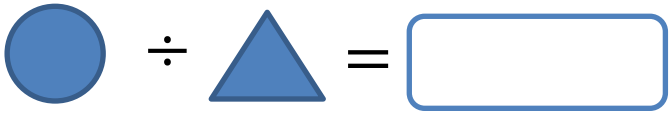
1 If you know that





Work out





.

2 Class 2 are completing number puzzles.

The number in the blue shape is the **sum** of the two numbers either side.



Complete these puzzles.







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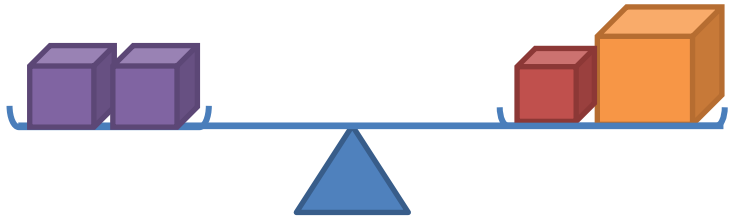
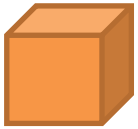
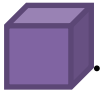
KS1 Problem Solving Questions

Thursday 2nd March 2017

1 The scales are balanced.



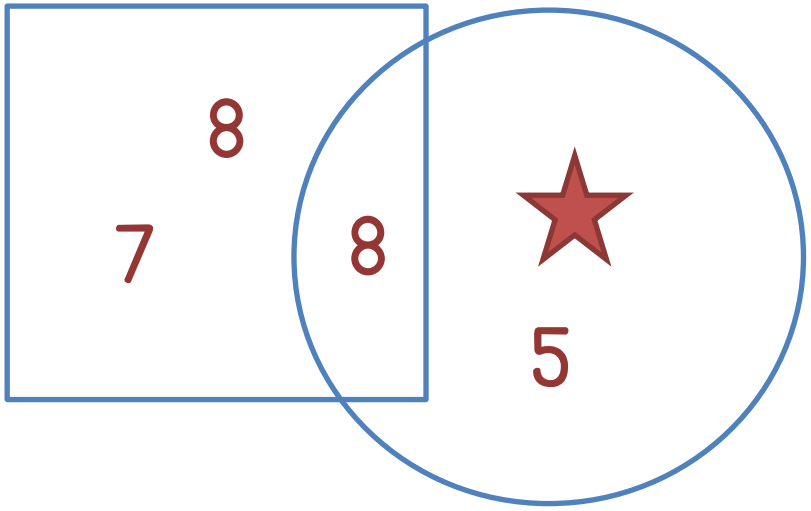
The mass of each  is 42g.

The  is 20g heavier than a .

Find the mass of the  .

.

2



The numbers in the square have the same **sum** as the numbers in the circle.

What number should replace the ?

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KS1 Problem Solving Questions

Friday 3rd March 2017

1 Use the cards to make 4 **different** number sentences.

7	5	2

$\square + \square = \square$

$\square = \square + \square$

$\square - \square = \square$

$\square - \square = \square$

2 Grace has these coins.



Anise has this coin.



Grace gives Anise a coin.

They now have the same amount of money.

Which coin did Grace give Anise?

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KS1 Problem Solving Questions

Monday 6th March 2017

1 Complete each number sentence.

7 ones + 2 ones = ☐ ones

7 tens + 2 ones = ☐ ones

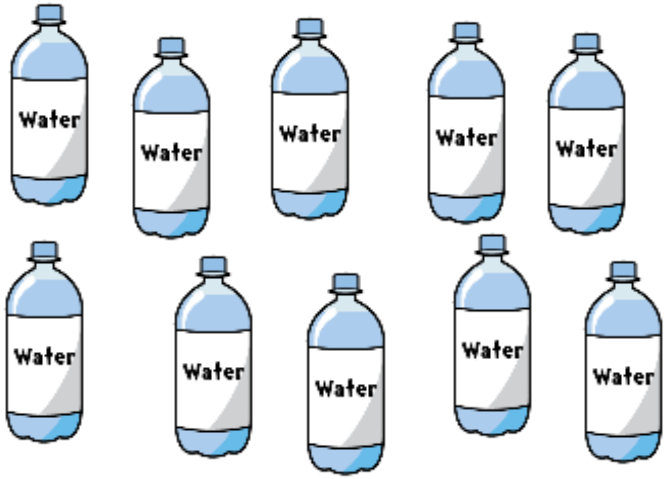
7 ones + 2 tens = ☐ ones

7 tens + 2 tens = ☐ ones

2 **Two** bottles of water cost £4



How much do 10 bottles of water cost?



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KS1 Problem Solving Questions

Tuesday 7th March 2017

1 A money box contains some 10p coins.



Mike takes out 20p.

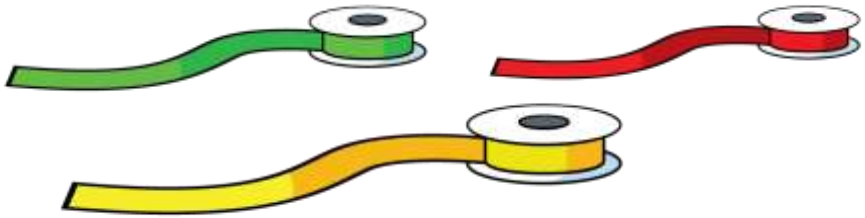
Hassan takes out 40p

These coins are left in the box.



How many **coins** were in the box at the start?

2 Here are 3 pieces of ribbon.



- The red ribbon is 38 cm long.
- The yellow ribbon is 12 cm shorter than the red ribbon.
- The green ribbon is 5 cm longer than the red ribbon.

How much longer is the green ribbon than the yellow ribbon?

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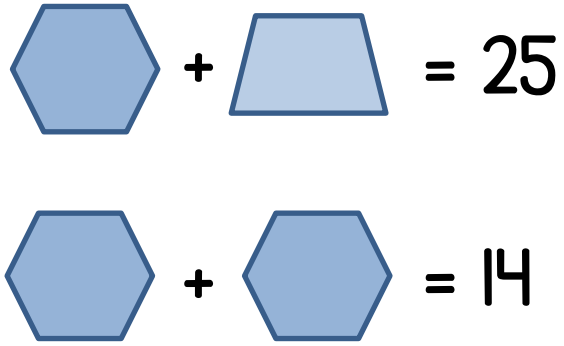
KS1 Problem Solving Questions

Wednesday 8th March 2017

1

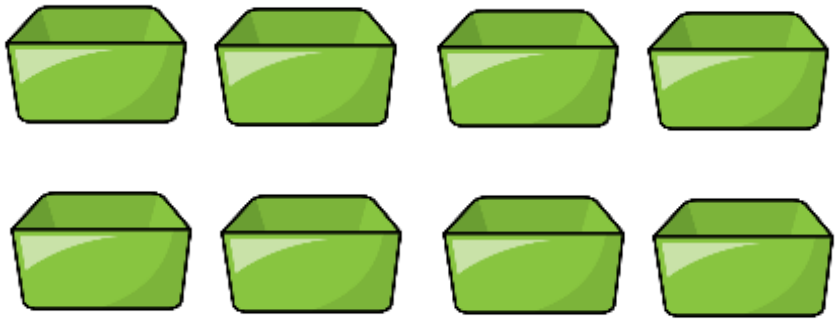


What is the value of each symbol?

2 Work out

Eight tens subtract eight ones

3 Ammar has 8 boxes.



He puts 5 marbles in each box.

He has 42 marbles left over.

How many marbles did he have at the start?

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KS1 Problem Solving Questions

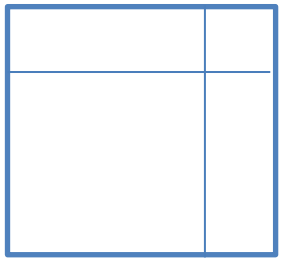
Thursday 9th March 2017

1 Write a number in each box to make the sentences correct.

$6 \times 5 = \square + 10$

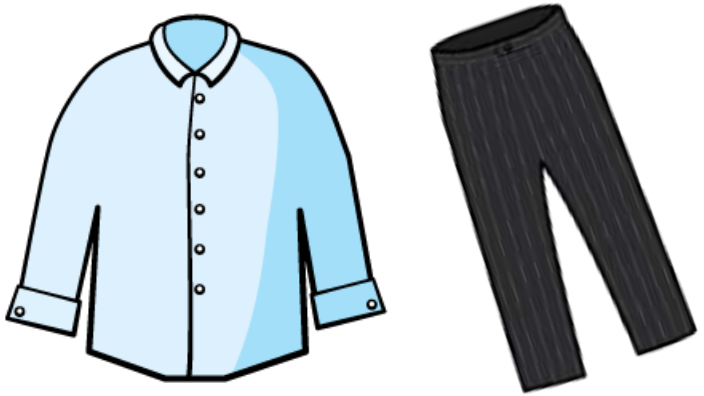
$10 + \square = 8 \times 2$

2 Has this shape been divided into quarters?



Explain your answer.

3 Mr Baker buys a shirt and a pair of trousers.



The total cost is £40

The shirt costs £12

How much **more** does the pair of trousers cost than the shirt?

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KS1 Problem Solving Questions

Friday 10th March 2017

1 Zain buys 2 cans of cola.



He pays 80p in total.



Rose buys a can of cola and a cake.



She pays 65p in total.

How much does one cake cost?

2 The pictogram shows the number of children who visited the park last week.

Monday	☺☺☺☺☺
Tuesday	☺☺
Wednesday	☺◔
Thursday	☺☺☺
Friday	☺☺

☺ is 10 children

How many **more** children visited the park on Monday than Friday?

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KS1 Problem Solving Questions

Monday 13th March 2017

1 If

$$24 + \bigcirc = 32$$

Work out

$28 + \bigcirc =$ ☐

$\bigcirc + 38 =$ ☐

$32 - \bigcirc =$ ☐

$35 - \bigcirc =$ ☐

2 A sack of potatoes weighs 25kg.



The potatoes are put into a barrel.



The weight of the barrel and potatoes is 62kg.

How much did the barrel weigh before the potatoes were added?

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KS1 Problem Solving Questions

Tuesday 14th March 2017

1 Meg has some 5p and 10p coins.

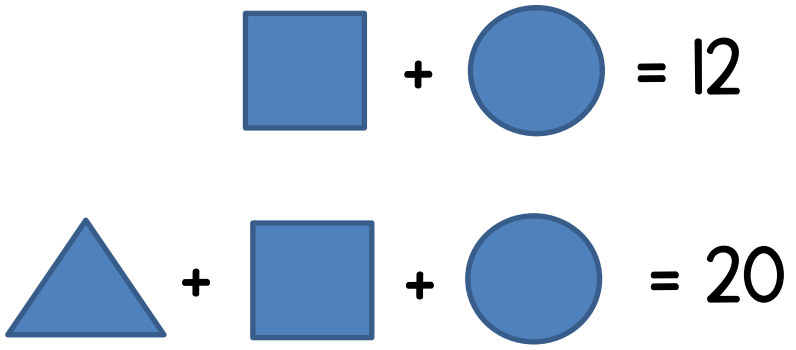
Here are her 5p coins.



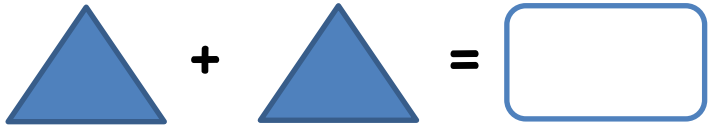
In total Meg has 95 pence.

How many 10p coins does Meg have?

2 Each symbol represents a number.



Work out



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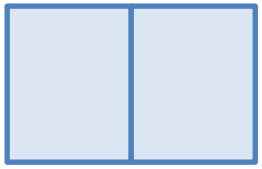
KS1 Problem Solving Questions

Wednesday 15th March 2017

1 Henry makes a 2-digit number.







What number did Henry make?

2 Mrs Berry bakes muffins.

She sells them in her shop.



On Monday she bakes 25 and sells 18.

(a) How many does she have left?

On Tuesday she baked twice as many muffins but has the same amount left.

(b) How many did she sell on Tuesday?

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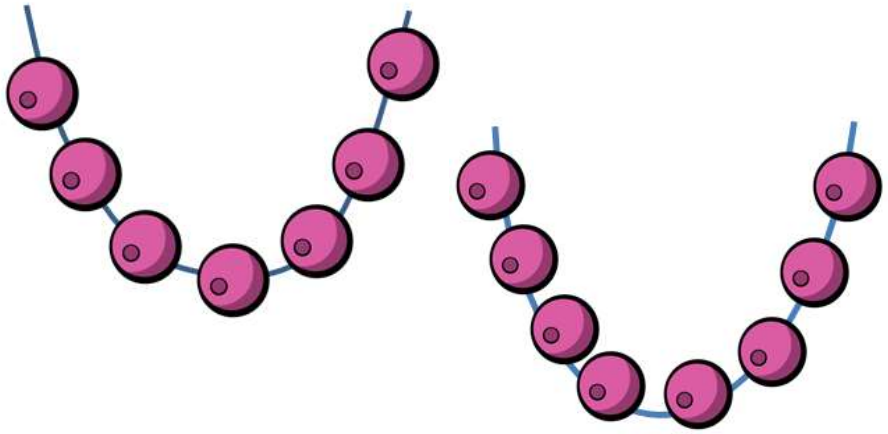
KS1 Problem Solving Questions

Thursday 16th March 2017

1 Jenny is making chains of beads.

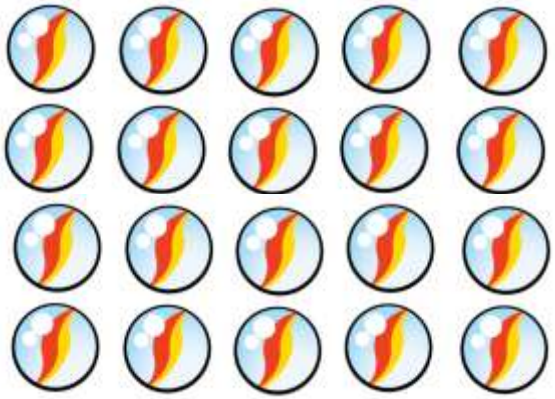
She has 20 beads.

She makes the following chains.



How many beads does Jenny have left?

2 Dee has 20 marbles and some bags.



She puts 2 marbles in each bag.

(a) How many bags does she use?

Sarah also has 20 marbles and some bags.

Sarah puts 5 marbles in each bag.

(b) How many fewer bags does Sarah use?

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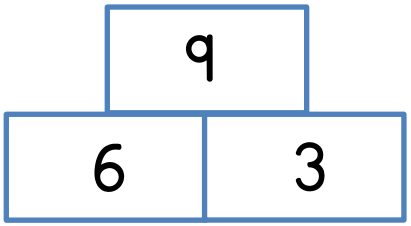
KS1 Problem Solving Questions

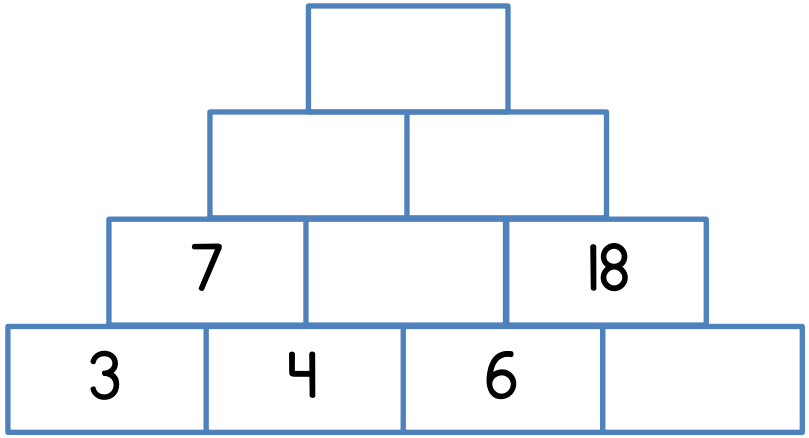
Friday 17th March 2017

1 Here is an addition pyramid.

The number in the top box is the sum of the two numbers below.



Complete the addition pyramid.



2 Mel, Martina and Pat have the **same** number of cards.



Mel and Martina each give Pat 4 cards.

Pat now has 17 cards.

How many cards do they have altogether?

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KS1 Problem Solving Questions

Monday 20th March 2017

1 Work out these number problems.

$12 \times 5 = 50 +$ ☐

70 is 26 more than ☐

The difference between two numbers is 15

One of the numbers is 42

What could the other number be?

2 Jo is standing in a queue.



There are 15 people in front of her.

There are 17 people behind her.

How many people are in the queue?

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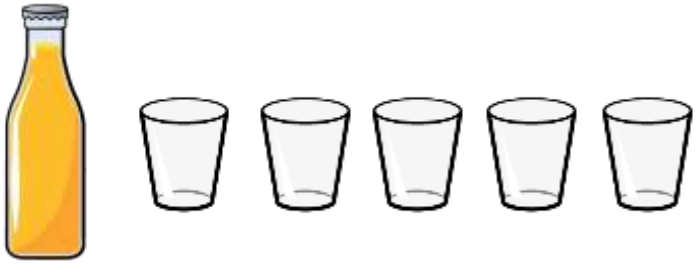
KS1 Problem Solving Questions

Tuesday 21st March 2017

1 A bottle holds 5 glasses of juice.



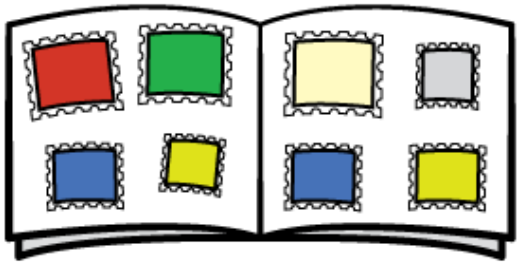
A barrel holds 7 bottles of juice.



How many glasses of juice can fit into the barrel?

2 Jenny collects stamps.

She has 65 stamps.



Jenny has 31 more stamps than Alf.

Alf gives 19 of his stamps away.

How many stamps does Alf have left?

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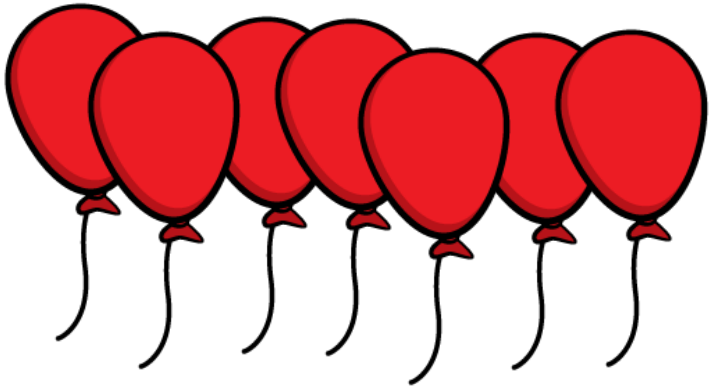
KS1 Problem Solving Questions

Wednesday 22nd March 2017

1 Liam has some balloons.



- He has 7 red balloons.
- He has 2 more green balloons than red balloons.
- He has 3 less blue balloons than green balloons.

How many balloons does he have in total?

2 Here are 3 number patterns.

0	5	●	15	20	25	30	35

82	72	62	52	42	32	▲	12

3	6	9	12	■	18	21	24

Three numbers are covered.

Order the symbols from the least to the greatest value.

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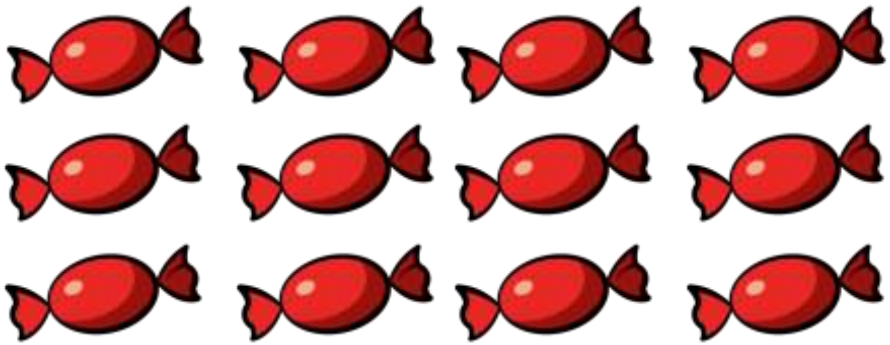
KS1 Problem Solving Questions

Thursday 23rd March 2017

1 Danny has 12 sweets.

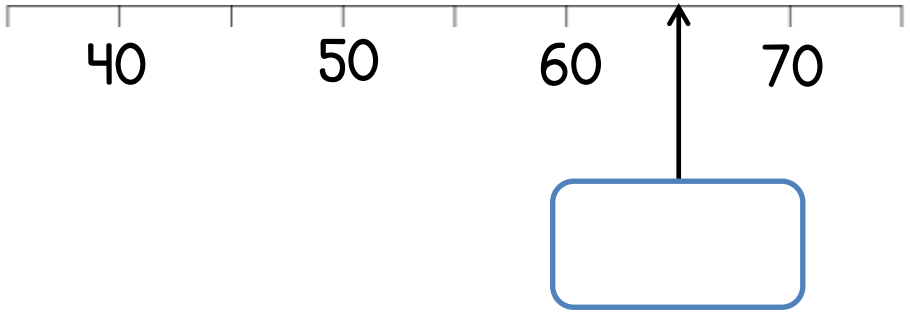


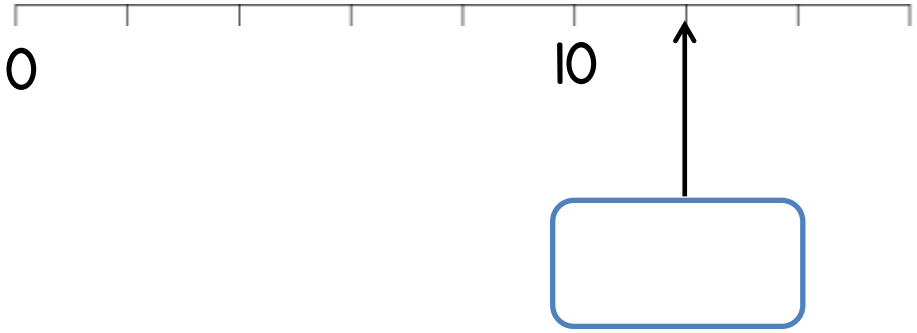
He gives Jess **a quarter** of the sweets.

He gives Mani 5 sweets.

How many sweets does he have left?

2 What number is each arrow pointing to?





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KS1 Problem Solving Questions

Friday 24th March 2017

1 Write <, > or = to make each statement correct.

$10 + 5 \bigcirc 10 \times 5$

$8 \times 2 \bigcirc 2 \times 8$

$20 + 17 \bigcirc 20 + 15$

$20 - 17 \bigcirc 20 - 15$

2 A shop sells mugs.



Mark spends £10 on mugs

How many mugs does he buy?

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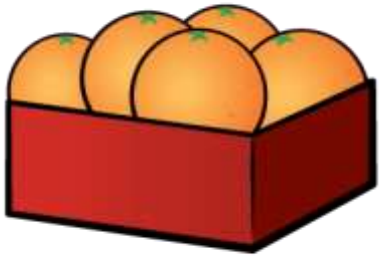
KS1 Problem Solving Questions

Monday 27th March 2017

1 Tia has 12 boxes of oranges.

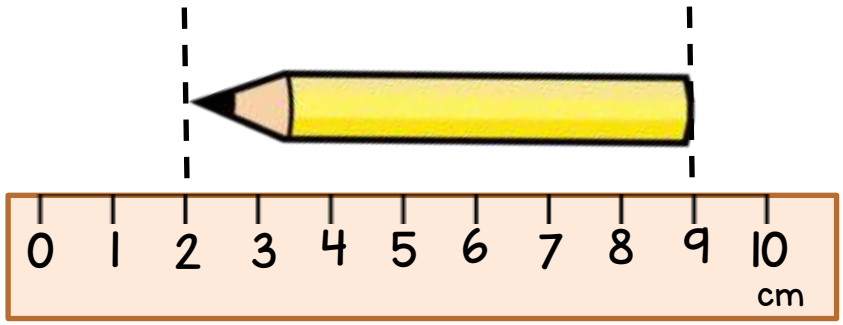
Each box contains 5 oranges.



Tia sells 42 oranges.

How many oranges does she have left?

2 Here is a pencil.



How long are 2 of these pencils?

3 Work out

19 ones + 3 tens and 4 ones

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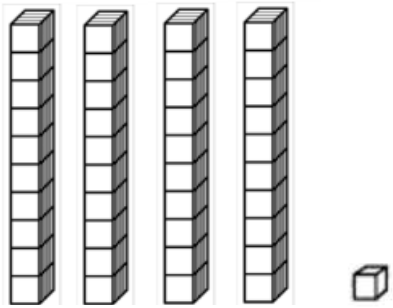
KS1 Problem Solving Questions

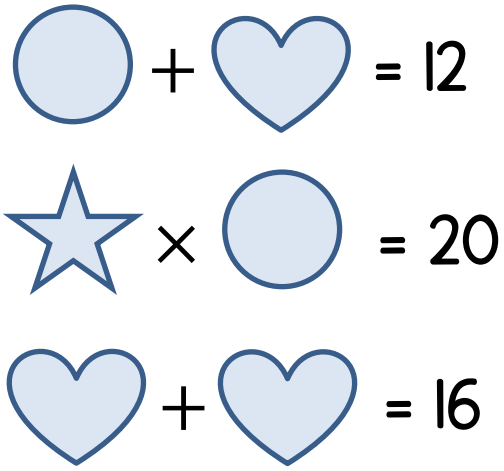
Tuesday 28th March 2017

1 Yin makes a number.



What is 2 tens more than this number?

2 Work out the value of each symbol.



3 Use the information to work out how much each person weighs.

- Gina is the lightest. She weighs 32kg.
- Max is 45kg heavier than Gina.
- Riya is double Gina's weight.
- Cara is 19 kg lighter than Max.

Put the people in order of weight.
Start with the lightest.



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KS1 Problem Solving Questions

Wednesday 29th March 2017

1 Complete

65 is ☐ more than 35

16 is double ☐

44 is ☐ less than 100

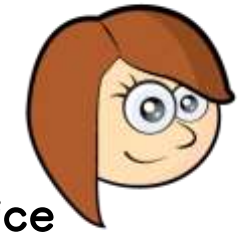
2 Rik has this money



He gives one quarter of it to his mum.

How much does he have left?

3 Today is Wednesday.



Alice

It is my birthday in three days.

My birthday is 5 days before Alice's.



Sam



Josh

My birthday is 10 days after Sam's

What day is Josh's birthday on?

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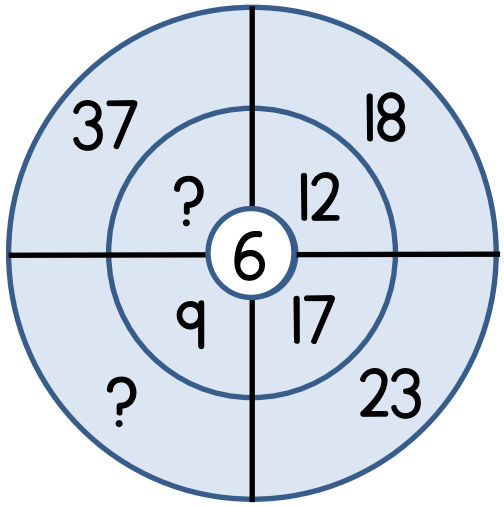
KS1 Problem Solving Questions

Thursday 30th March 2017

1 Here is a number puzzle.

Can you work out the two missing numbers?



2 Here are some bottles of water.



Each bottle holds 2 litres.

All of the water is poured into an empty barrel.



The barrel is now half full.

How much does the barrel hold when full?

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KS1 Problem Solving Questions

Friday 31st March 2017

1 A packet contains 5 sweets.



Tonya sells 4 packs on Monday.

She sells 3 more packets on Tuesday than she did on Monday.

How many **sweets** were sold in total?

2 Maria buys 7 eggs.



She pays £14 in total.

How much do 4 eggs cost?

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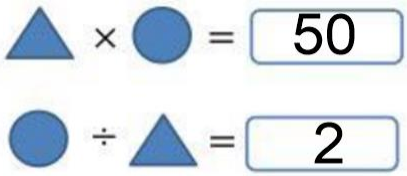
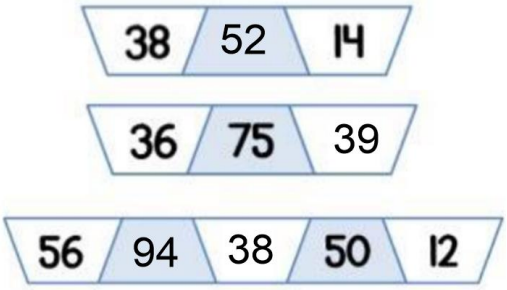
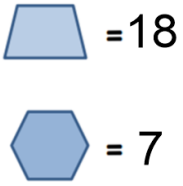
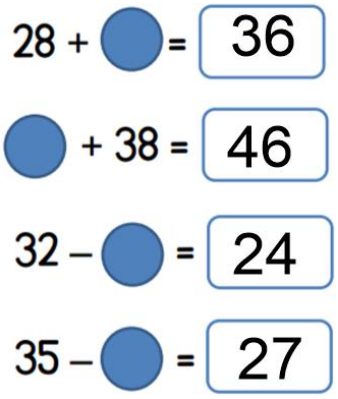
Reasoning and Problem Solving Questions

Day	Question	Answer	Notes
1	1		
	2		Can they make their own puzzle?
2	1	22g	Children could solve this problem practically if scales are available.
	2	★ = 10	
3	1	5 + 2 = 7 7 = 2 + 5 7 – 5 = 2 7 – 2 = 5	The children could also write: 2 + 5 = 7 7 = 5 + 2 2 = 7 – 5 5 = 7 – 2
	2		

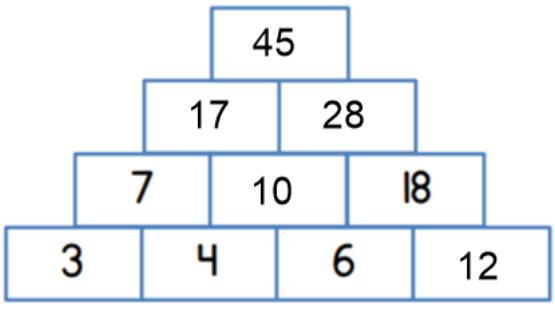
Reasoning and Problem Solving Questions

4	1	7 ones + 2 ones = 9 ones 7 tens + 2 ones = 72 ones 7 ones + 2 tens = 27 ones 7 tens + 2 tens = 90 ones	This could be set up practically using Base 10 or place value counters.
	2	£20	One bottle of water costs £2 Five bottles of water cost £10
5	1	9 x 10p coins	6 coins were taken out.
	2	17cm	Children could draw a bar model to represent this problem. Which ribbon is longest? Which ribbon is shortest? How much ribbon is there altogether?
6	1		Children need to work out the value of the hexagon first.
	2	72	This could be set up practically using Base 10 place value counters.
	3	82	
7	1	6 × 5 = 20 + 10 10 + 6 = 8 × 2	

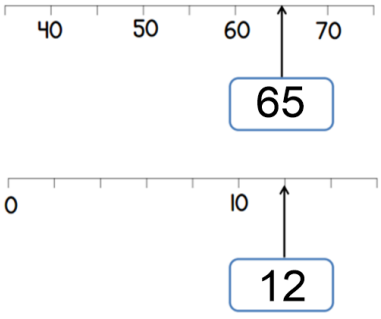
Reasoning and Problem Solving Questions

	2	This shape has not been divided into quarters.	Children should use the words ‘equal parts’ in their explanation. Can they show a shape that has been dividing into quarters?
	3	£16	
8	1	25p	
	2	30	How many children visited the park altogether? Monday = 50 Tuesday = 20 Wednesday = 15 Thursday = 30 Friday = 20 Total = 135
9	1		Can the children use each previous question to work their answers out quickly?
	2	37kg	
10	1	Meg has six 10p coins	
	2		To work out the value of the triangle the children need to replace the square and the circle with 12 in the second calculation.

Reasoning and Problem Solving Questions

			What could the value of the square and the circle be? How many possibilities can you find?
11	1	46	
	2a	7	
	2b	43	
12	1	Jenny has 5 beads left	
	2a	Dee has used 10 bags	Ask the children to write a number sentence to show how they worked it out. 20 ÷ 2 = 10
	2b	Sarah has 6 fewer bags	Can they find another way to share the marbles out equally into a different number of bags? - 10 marbles in 2 bags - 4 marbles in 5 bags - 1 marble in 20 bags
13	1		
	2	27	

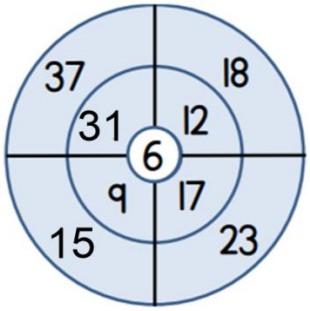
Reasoning and Problem Solving Questions

14	1	$12 \times 5 = 50 +$ 10 70 is 26 more than 44 The other number could be 57 or 27	
	2	There are 33 people in the queue	This could be done practically with children.
15	1	35 glasses of juice	
	2	Alf has 15 stamps left	
16	1	Liam has 22 balloons in total	Children could draw the balloons to show the total.
	2	Least Greatest  10 15 22	What is the total of the 3 symbols? 10 + 15 + 22 = 47
17	1	Danny has 4 sweets left	One quarter = 3
	2	 	

Reasoning and Problem Solving Questions

18	1	$10 + 5 \bigcirc 10 \times 5$ $8 \times 2 \bigcirc 2 \times 8$ $20 + 17 \bigcirc 20 + 15$ $20 - 17 \bigcirc 20 - 15$	Can they complete the 3rd and 4th symbols without working out the answer to the calculations?
	2	Mark buys 15 mugs	How much would 30 mugs cost? £20 How many mugs could you buy for £4? 6 mugs
19	1	Tia has 18 oranges left	
	2	14cm	
	3	19 ones+ 3 tens+ 4 ones = 53	Can the children write this in a different way? E.g.19 ones + 34 ones 4 tens + 13 ones…..
20	1	61	What is 2 tens less than this number? 21 What is 2 ones less than this number? 39
	2	○ = 4 ☆ = 5 ♡ = 8	Children will need to work out the 3rd problem 1st to find the value of a heart.
	3	Gina (32kg), Cara (58kg), Riya (64kg), Max (77kg)	What is the difference between Max's weight and Riya's weight? 13kg

Reasoning and Problem Solving Questions

21	1	65 is [30] more than 35 16 is double [8] 44 is [66] less than 100	
	2	15p	One quarter = 5p
	3	Josh's birthday is on a Thursday	Alice's birthday is Saturday Sam's birthday is Monday
22	1		
	2	The barrel holds 40 litres when full	
23	1	55 sweets were sold in total	20 sweets on Monday 35 sweets on Tuesday
	2	£8	Each egg is £2