PROBLEM SOLVING 2

CONTENT DOMAIN REFERENCES:
A1, A4, A5

KS2 SATS

PRACTICE QUESTIONS BY TOPIC

1 [Extra]

Look at this equation.

$$3a + 20 = 4a + k$$

If $a = 15$, find the value of k

Show your method

$3 \times 15 + 20 = 4 \times 15 + k$

$45 + 20 = 60 + k$

$65 = 60 + k$

$k = 5$

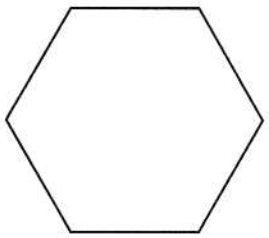
5

[2 marks]

2 [Extra]

The **perimeter** of a regular hexagon is $42a + 18$

Write an expression for the length of **one** of its sides.



[DIVIDE THE EXPRESSION BY 6]

$7a + 3$

The **perimeter** of a square is $4(c - 9)$

Find the perimeter of the square when $c = 15$

$4(15-9) = 4(6)$

MULTIPLY!

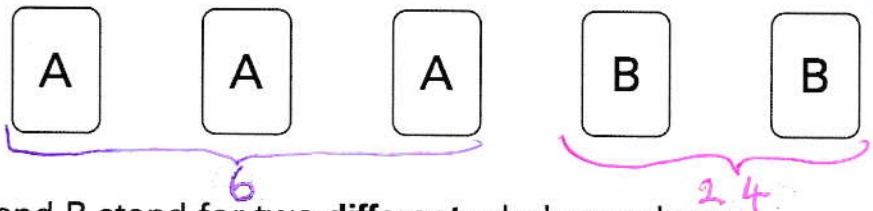
24

[2 marks]

Questions compiled by:
@Maths4Everyone

3 [2004]

Here are five number cards.



6 24

A and B stand for two **different** whole numbers.

The sum of all the numbers on all five cards is 30

LOTS OF ANSWERS SO I CHOSE TWO CONVENIENT NUMBERS!

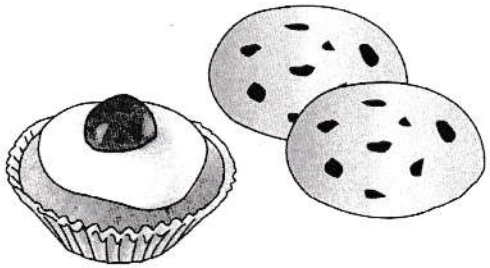
What could be the values of A and B?

A = 2 **B =** 12

OR 4 9
8 3

[1 mark]

4 [2013]



A cake costs 15p more than a biscuit.

Megan bought a cake and two biscuits for 90p.

I LIKE THIS METHOD, BOT YOU CAN USE ANY METHOD

How much do a cake and a biscuit each cost?

Show your method

C + 2B = 90

SWAP THE CAKE FOR A BISCUIT

3B = 75

B = 25

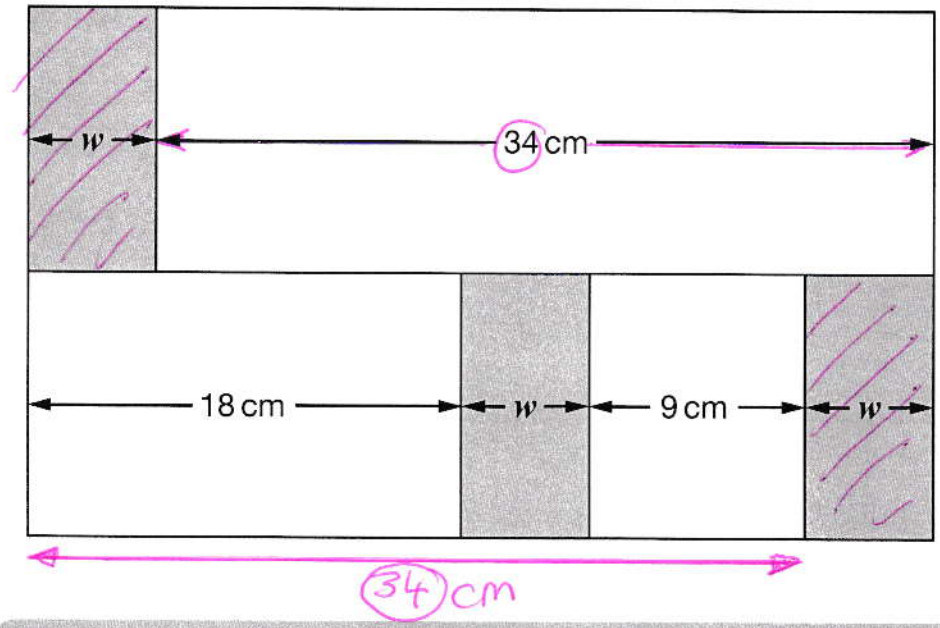
B=25, C=40

BISCUIT IS 15p LESS!

[2 marks]

5 In this diagram, the shaded rectangles are all of equal width (w).

[2017]



Not to scale

Calculate the width (w) of one shaded rectangle.

Show your method

DIAGRAM SHOWS THAT

$w + 27 = 34$

$\Rightarrow \quad w = 7$

7cm

[2 marks]

6 The **sum** of two numbers is **998** → 499 IF THEY WERE EQUAL.

[Extra] The **difference** between them is **10** → +5 AND −5 GIVES A DIFFERENCE OF 10!

What are the two numbers?

Show your method

$499 + 5 = 504$

$499 - 5 = 494$

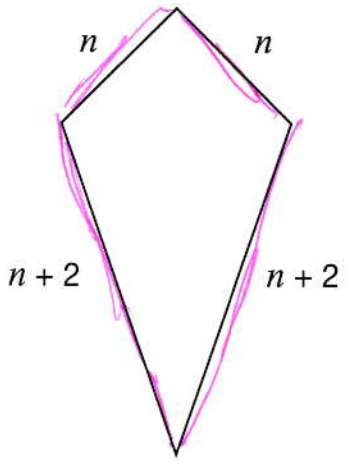
494 AND 504

[2 marks]

7 [Extra]

The diagram shows a kite.

The side lengths are in centimetres.



Not drawn accurately

PERIMETER IS $4n + 4$

When $n = 9$, what is the perimeter of the kite?

$4 \times 9 + 4$

$= 36 + 4$

40 cm

When the perimeter of the kite is **100 cm**, what is the value of n?

$P = 4n + 4$

$100 = 4n + 4$

$96 = 4n$

$n = \frac{96}{4}$

$= 24$

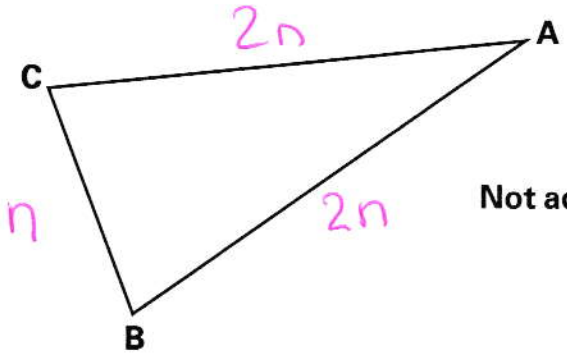
$n =$ 24

[3 marks]

8 [2001]

Triangle **ABC** is isosceles and has a perimeter of 20 centimetres.

Sides **AB** and **AC** are each **twice** as long as **BC**.



Not actual size

PERIMETER = 5n

Calculate the length of the side **BC**.

Do not use a ruler.

Show your method

$5n = 20$

$n = \frac{20}{5}$

$= 4$

4cm

[2 marks]

9 [2000]

n stands for a number.

Complete this table of values.

n	$5n - 2$
20	98
8	38

$5 \times 20 - 2$

$5n - 2 = 38$

$5n = 40$

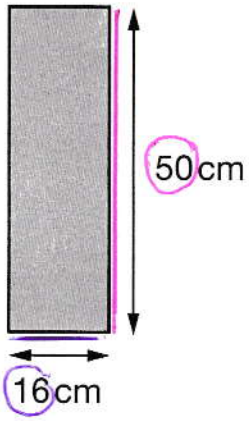
$n = \frac{40}{5}$

[2 marks]

10 [2007]

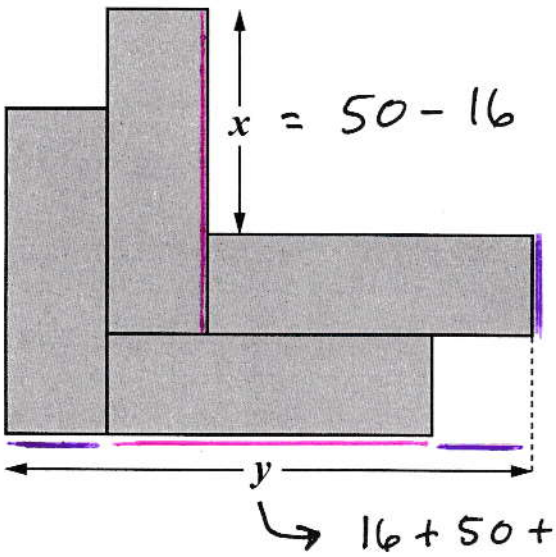
Kate has some rectangles.

They each measure 16 centimetres by 50 centimetres.



Not actual size

She makes this design with four of the rectangles.



PINK LINES = 50 cm

PURPLE LINES = 16 cm

Work out the lengths x and y.

$x =$ 34 cm

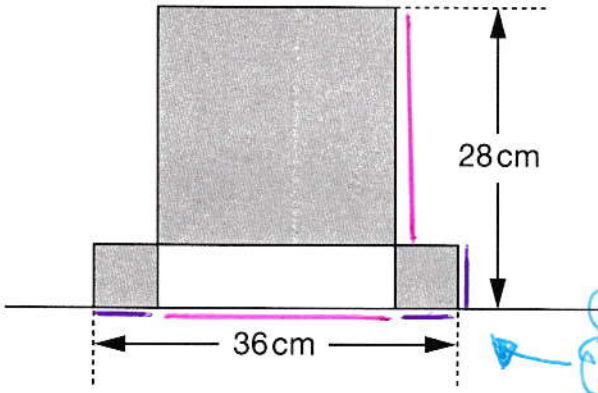
$y =$ 82 cm

[2 marks]

11 This design has **one large square** and **two identical small squares**.

[2009]

The design measures 36 centimetres by 28 centimetres.



Not actual size

DIFFERENCE BETWEEN HEIGHT AND WIDTH IS ONE SMALL SQUARE

Calculate the length of a side of the **large** square.

Show your method

SMALL SQUARE SIDE = 36 - 28
= 8cm

LARGE SQUARE SIDE
= 28 - 8
= 20cm

20 cm

[2 marks]

12 Look at these equations.

[Extra]

$11 = 6 + a$ → $a = 5$

$a + 7 = 10 + b$

$5 + 7 = 10 + b$ → $12 = 10 + b$ → $b = 2$

Use both equations to work out the value of b

$b =$ 2

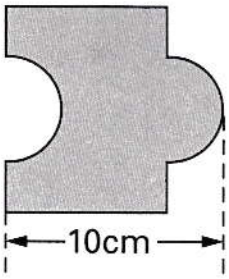
[2 marks]

13 Josh has some tiles.

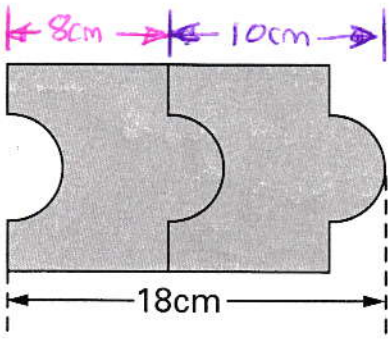
[2005]

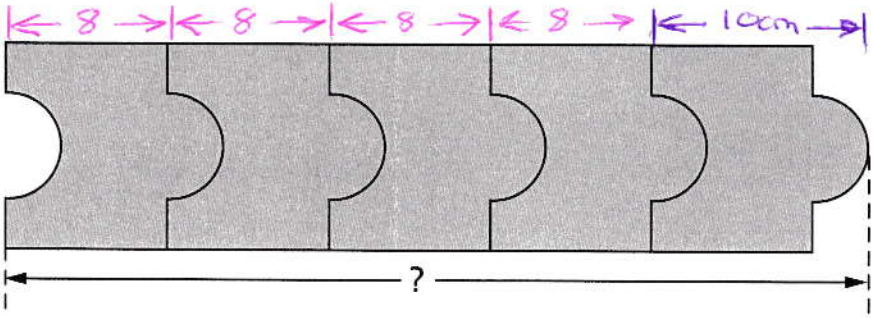
Not actual size

Each tile is 10cm long.



Two tiles fitted together are 18cm long.





Calculate the length of **five** tiles fitted together.

Show your method

$10 + 4 \times 8 = 10 + 32$

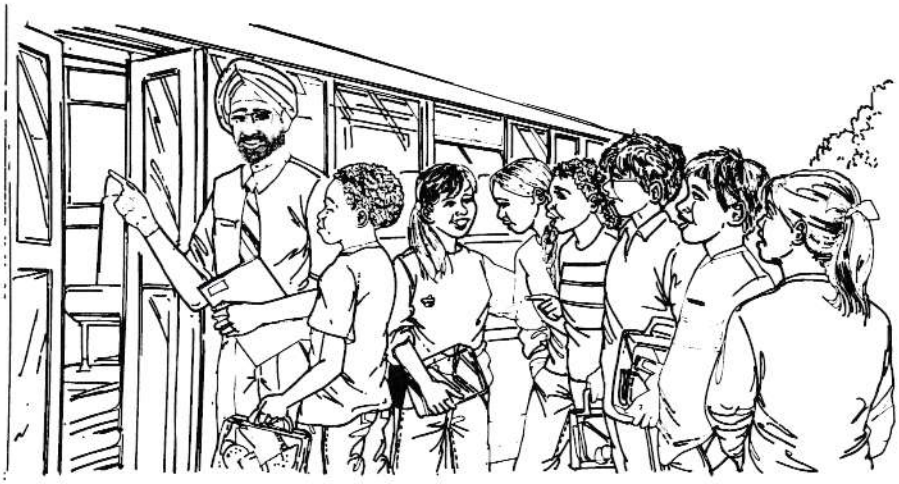
$= 42$

42cm

[2 marks]

14

[2003]



30 children are going on a trip.

It costs **£5** including lunch.

Some children take their own packed lunch.

They pay only **£3**

The 30 children pay a total of **£110**

How many children are taking their own packed lunch?

Show your method

IF ALL CHILDREN HAD LUNCH PROVIDED FOR THEM

30 x 5 = £150

COST WAS £40 LESS

EACH PACKED LUNCH WAS £2 LESS

20

SO $\frac{40}{2}$ = 20 CHILDREN HAD PACKED LUNCH

[2 marks]

15

[2000]

Two families go to the cinema.

The Smith family buy tickets for **one adult** and **four children** and pay **£19**

The Jones family buy tickets for **two adults** and **two children** and pay **£17**

KEY

$A + C = £8.50$!

What is the cost of **one child's ticket**?

Show your method

$A + 4C = 19$

$A + C = 8.50$

DIFFERENCE IS 3 CHILDREN

$\Rightarrow 3C = 10.50$

$C = 3.50$

£3.50

[2 marks]

16

[2000]

The sum of two numbers is 5. → 2.5 IF THEY WERE THE SAME

The difference between the numbers is 0.5 → ±0.25 GIVES A DIFFERENCE OF 0.5 !

What are the numbers?

$2.5 + 0.25$

$2.5 - 0.25$

2.75 and 2.25

[1 mark]

17

[2002]

Lili and Julian each start with the **same** number.

Lili works out **half of the number**.

Julian works out **three-quarters of the number**.

The **sum** of their answers is **275**

KEY

$\frac{1}{2} + \frac{3}{4} = \frac{5}{4}$

What was the number they started with?

Show your method

$\frac{5}{4}$ OF NUMBER = 275

$\Rightarrow \frac{1}{4}$ OF NUMBER = 55

$\Rightarrow$ NUMBER = 4 × 55

= 220

220

055

5 | 275

[2 marks]