

Section One:

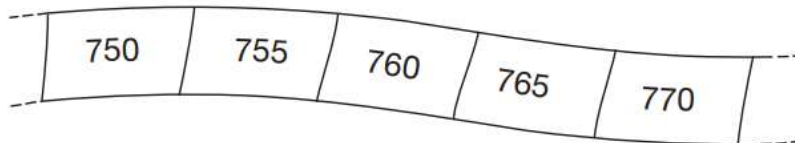
Sequences

1

Here is part of a number sequence.

[2007]

The numbers increase by the same amount each time.



The sequence continues.

Circle **all** of the numbers below that would appear in the sequence.



840 905 989 1000 2051

[1 mark]

2

Here is part of a number sequence.

[2011]

The numbers in the sequence increase by 25 each time.

50 75 100 125 ...

Circle **all** of the numbers below that will appear in the sequence.



255 650 735 900 995

[1 mark]

4

The numbers in this sequence increase by 14 each time.

[2016]

Write the missing numbers.

82 96 124 138

[2 marks]

5

The numbers in this sequence increase by 30 each time.

[2015]

20 50 80 110 ...

The sequence continues in the same way.

Which number in the sequence will be **closest to 300**?

Show your method

[2 marks]

8

The numbers in this sequence increase by 10 each time.

[2014]

3 13 23 ...

The sequence continues in the same way.

Write **two** numbers from the sequence that add to make a total of **96**



and

Explain why it is **not** possible to find **three** numbers from the sequence that add to make a total of **96**

[2 marks]

9

The numbers in this sequence increase by the same amount each time.

[2014]

Write the two missing numbers.



610

650

690

[2 marks]

14

The numbers in this sequence increase by the same amount each time.

[2017]

Write the missing numbers.

	1	$1\frac{5}{8}$	$2\frac{1}{4}$	
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[2 marks]

15

The numbers in this sequence increase by 7 each time.

[2008]

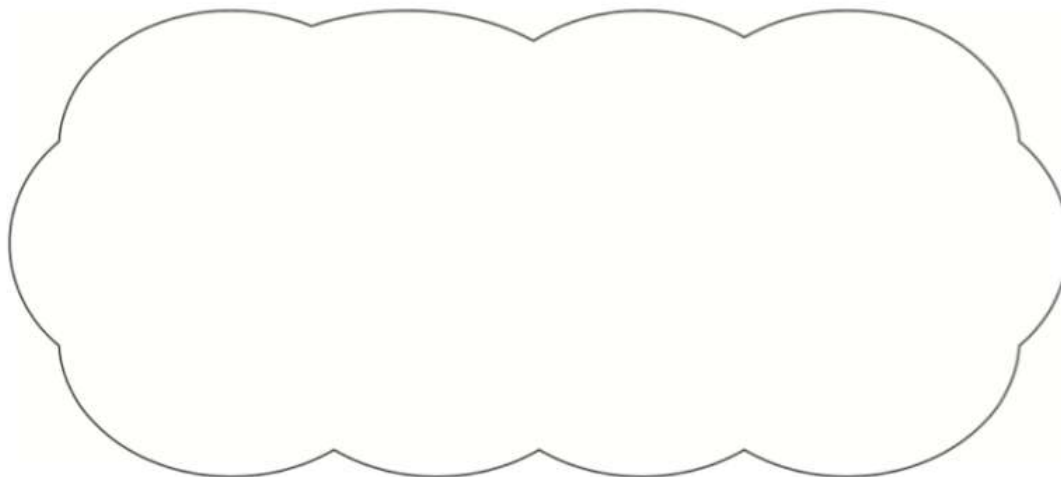
1 8 15 22 29

The sequence continues in the same way.

Will the number 777 be in the sequence?
Circle **Yes** or **No**.

 Yes / No

Explain how you know.



[1 mark]

16

The numbers in this sequence increase by equal amounts each time.

[2015]

Write in the three missing numbers.

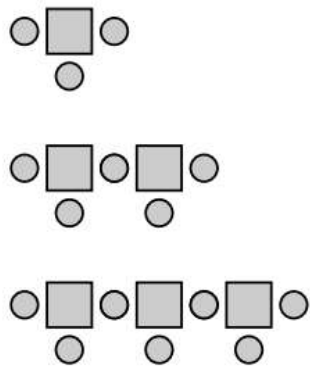


[1 mark]

17

Here is a sequence of patterns made from squares and circles.

[2001]



number of squares	number of circles
1	3
2	5
3	7

The sequence continues in the same way.

Calculate how many **squares** there will be in the pattern which has **25 circles**.

Show your method

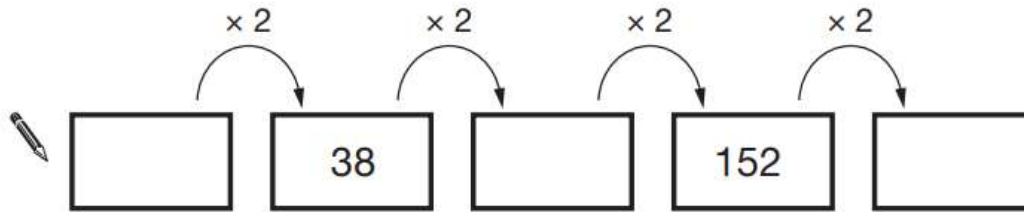
[2 marks]

1

Here is a doubling sequence.

[2015]

Write the three missing numbers.



[2 marks]

2

Hayley makes a sequence of numbers.

[2003]

Her rule is

'find half the last number then add 10'

Write in the next two numbers in her sequence.



[2 marks]

3

In this sequence each number is double the previous number.

[2003]

Write in the missing numbers.



[2 marks]

6

Here is an expression.

[Extra]

$$2a + 3 + 2a$$

Which expression below shows it written as simply as possible?

Put a ring round the correct one.

$7a$

$7 + a$

$2a + 5$

$4a + 3$

$4(a + 3)$

Here is a different expression.

$$3b + 4 + 5b - 1$$

Write this expression as simply as possible.



[2 marks]

7

Complete the statements below.

[Extra]

When x is 8, $4x$ isWhen x is, $4x$ is 48

10A ruler costs k pence.

[Extra]

A pen costs m pence.

Match each statement with the correct expression for the amount in pence.

The first one is done for you.

Statement	Expression
The total cost of 5 rulers	$5k$
The total cost of 5 rulers and 5 pens	$5m$
How much more 5 pens cost than 5 rulers	$5 - 5m$
The change from £5, in pence, when you buy 5 pens	$500 - 5m$
	$5k + m$
	$5(k + m)$
	$5m - 5k$
	$5k - 5m$

[2 marks]

11When $x = 8$, what is the value of $3x - x$?

[Extra]

Tick (✓) the correct box below.


 0 3 16 30 None of these

[1 mark]


12

Write the missing numbers.

[Extra]


$$6x + 2 = 10$$

so $6x + 1 = \underline{\hspace{2cm}}$


$$1 - 2y = 10$$

so $(1 - 2y)^2 = \underline{\hspace{2cm}}$

[2 marks]

13When $y = 1$, which expression below has the **largest value**?

[Extra]

Put a ring round it.

$3 + y$

$10 - y$

y^2

$3y$

$\frac{y}{2}$

[1 mark]

14

Look at the equation.

[Extra]

$$14n = 98$$

Work out the value of $140n$  $\underline{\hspace{2cm}}$

[1 mark]

27

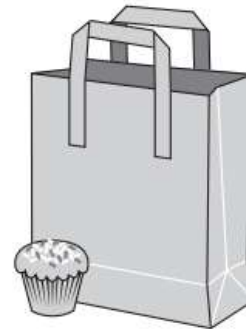
28

Section Three:

Formulae

1
[2016S]

Maria bakes cakes and sells them in bags.



She uses this formula to work out how much to charge for one bag of cakes.

$$\text{Cost} = \text{number of cakes} \times 20\text{p} + 15\text{p for the bag}$$

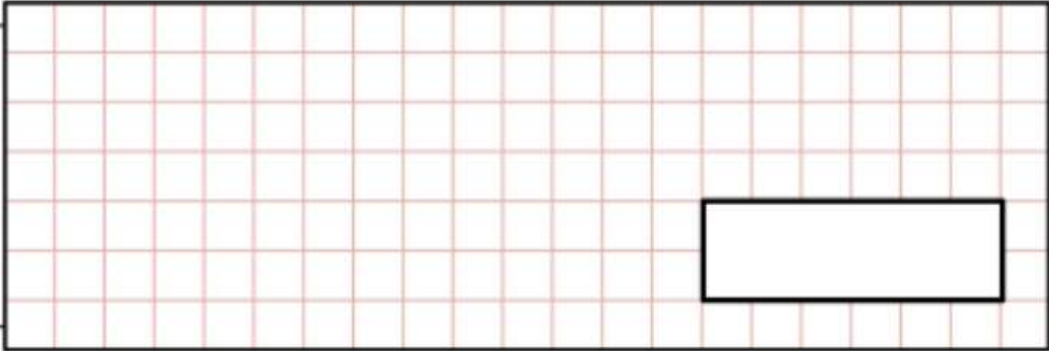
How much will a bag of 12 cakes cost?

£

Olivia buys a bag of cakes for £5.15

Use the formula to calculate how many cakes are in the bag.

Show your method


--

[3 marks]

2

Here is the rule that an electrician uses to work out how much to charge a customer.

[Extra]

$$\text{Cost in pounds} = 25 \times \text{hours worked} + 55$$

The electrician takes **three hours** to replace some electrical cable and some sockets.

Use the rule to work out how much the electrician should charge the customer.

£

[2 marks]

3

Here is a rule for the time it takes to cook a chicken.

[2017]

$$\text{Cooking time} = 20 \text{ minutes plus an extra } 40 \text{ minutes for each kilogram}$$

How many minutes will it take to cook a 3 kg chicken?

minutes

What is the mass of a chicken that takes 100 minutes to cook?

kg

[2 marks]

10

[Extra]

The cost to hire a boat on a lake is worked out using the information below.

Cost to hire a boat:

£4.50 per boat

and then

£3.50 per hour



Four friends hire a boat for five hours.

They share the cost equally.

How much does **each** person pay?

£

Chen's family hires a boat and pays a total of £15

How many hours did they have the boat for?

hours

[2 marks]

14

To find the n th triangular number, you can use this rule.

[Extra]

$$n\text{th triangular number} = \frac{n}{2}(n + 1)$$

$$\begin{aligned}\text{Example: 3rd triangular number} &= \frac{3}{2}(3 + 1) \\ &= 6\end{aligned}$$

Work out the **10th** triangular number.



Now work out the **100th** triangular number.



[2 marks]

3

Josh thinks of a number.

[2005]

He adds 4

He multiplies his result by 3

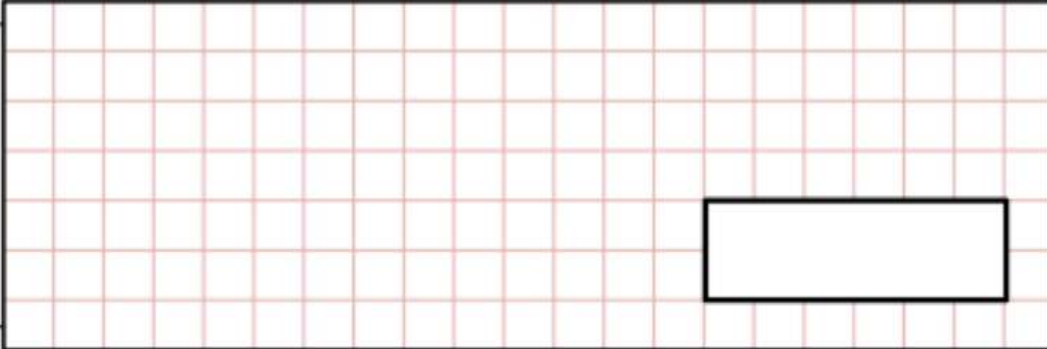
Then he takes away 9

His final answer is 90



What number did Josh start with?

Show your method



[2 marks]

4

Lara chooses a number less than 100

[2016S]

She divides it by 3 and then subtracts 11

She then divides this result by 2

Her answer is 10.5

What was the number she started with?

Show your method



[2 marks]

7

Lara chooses a number less than 20

[2016]

She divides it by 2 and then adds 6

She then divides this result by 3

Her answer is 4.5

What was the number she started with?

Show your method



[2 marks]

8

Monica thinks of a whole number.

[Extra]

She multiplies it by 3

She rounds her answer to the nearest 10

The result is 40

Write all the possible numbers that Monica could have started with.

[2 marks]

10

Dev thinks of a **whole** number.

[2017]

He multiplies it by 4

He rounds his answer to the nearest 10

The result is 50

Write **all** the possible numbers that Dev could have started with.

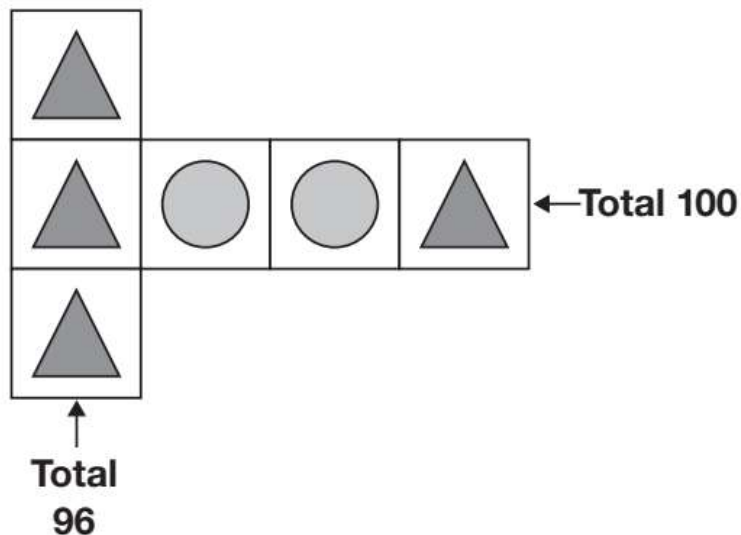
[2 marks]

Section Five: Problem Solving

1

Each shape stands for a number.

[2016]



Work out the **value** of each shape.

$$\triangle = \underline{\hspace{2cm}}$$

$$\circ = \underline{\hspace{2cm}}$$

[2 marks]

2

n stands for a whole number.

[2014]

$2n$ is greater than 30

$5n$ is less than 100

Write **all** the numbers that n stands for.



[1 mark]

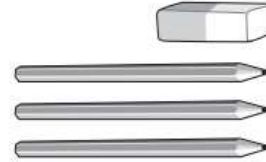
5

[2016]

6 pencils cost **£1.68**



3 pencils and 1 rubber cost **£1.09**



What is the cost of **1 rubber**?

Show your method



[2 marks]

6

[Extra]

Here is an equation.

$$m - 2n = 10$$

When $n = 20$ what is the value of m ?



$$m = \underline{\hspace{2cm}}$$

When $m = 20$ what is the value of n ?



$$n = \underline{\hspace{2cm}}$$

[2 marks]

9

$n = 22$

[2016]

What is $2n + 9$?

$2q + 4 = 100$

Work out the value of q .

$q =$

[2 marks]

10

[2005]



Sapna and Robbie have some biscuits.

Altogether they have **14** biscuits.Sapna has **2 more** biscuits than Robbie.

How many biscuits do Sapna and Robbie each have?



Sapna

Robbie

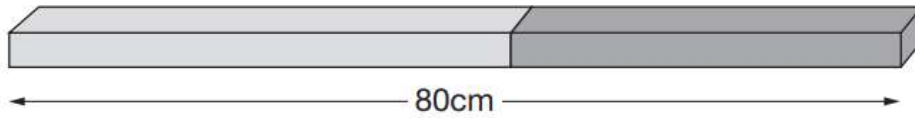
[2 marks]

20

Alfie has two sticks.
He puts them end to end.

Not
actual
size

[2014]



One stick is **10cm longer** than the other stick.

How long is the longest stick?

 cm

[1 mark]

21

Sarah, Amy and Liam stand on some weighing scales two at a time.

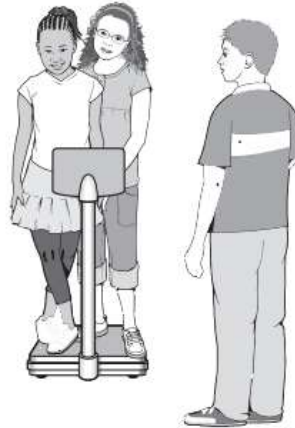
[2010]

Here are the measurements:

Sarah and Amy **70 kg**

Sarah and Liam **80 kg**

Liam and Amy **80 kg**



How much does Liam weigh?

Show your method

A large rectangular grid for showing the method. The grid is 10 units wide and 10 units high. A small rectangular box is drawn in the bottom right corner of the grid, intended for the final answer.

[2 marks]

22

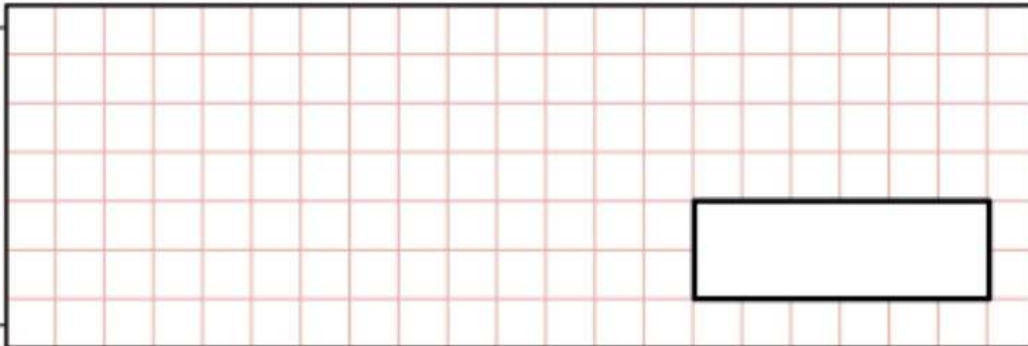
Hassan bought a notebook and a pen.
He paid £1.10

[2007]

Kate bought a notebook and 2 pens.
She paid £1.45

Calculate the cost of a notebook.

Show your method



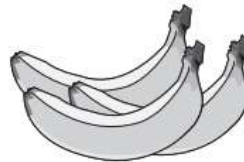
[2 marks]

23

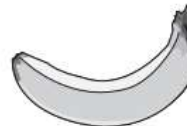
A shop sells fruit.

[2015]

Chen buys 2 apples and 3 bananas.
He pays £2.35



Megan buys 2 apples and 1 banana.
She pays £1.25



How much does one banana cost?

Show your method



[2 marks]

49

50