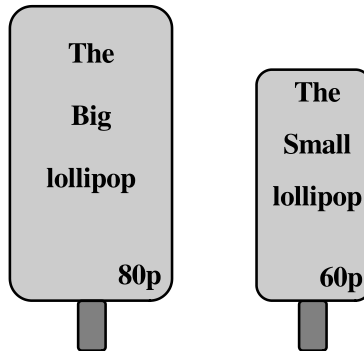


**Question 1**

A shop sells two types of lollipops.



The shop sells Big lollipops at 80p each and Small lollipops at 60p each.  
Henry buys  $x$  big lollipops

- (a) Write down an expression, in terms of  $x$ , for the cost of Henry's lollipops. **(1 mark)**

Lucy buys  $r$  Big lollipops and  $t$  Small lollipops

- (b) Write down an expression, in terms of  $r$  and  $t$ , for the total cost of Lucy's lollipops. **(1 mark)**

The cost of  $g$  Big Lollipops and 2 Small lollipops is £10.80

- (c) Write this as an equation in terms of  $g$ . **(2 marks)**  
(d) Use your equation to find the value of  $g$ . **(2 marks)**

---

**Question 2**

Here are the first five numbers of a simple number sequence.

1, 5, 9, 13, 17, ....., .....,

- (a) Write down the next two numbers in the sequence. **(2 marks)**
- (b) Describe, in words, the rule to continue this sequence. **(1 mark)**
- (c) Write down, in terms of  $n$ , the  $n$ th term of this sequence. **(2 marks)**

### Question 3

The diagrams show patterns made out of sticks.



Pattern number      1                                  2                                  3

(a) Draw a diagram to show pattern number 4. (1 mark)

The table below can be used to show the number of sticks needed for a pattern.

Pattern Number	1	2	3	4	5	6	7
Number of Sticks	3	5					

(b) Complete the table. (2 marks)

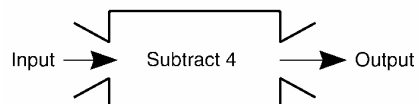
(c) i) Work out the number of sticks needed for pattern number 15.  
 ii) Explain how you obtained your answer. (4 marks)

(d) Write down a formula which can be used to calculate the number of sticks,  $S$ , in terms of the pattern number,  $n$ . (3 marks)

---

**Question 4**

The diagram shows a "Subtract 4" machine.



Use the machine to complete the table.

Input	Output
6	2
9	.....
.....	14
.....	29

---

**Question 5**

Here is a number pattern.  
Two numbers are missing.

6, 12, 18 .... 36.

- (a) Write in the missing numbers.
- (b) Describe, in words, the rule that you used to find the missing number in the pattern.

---

**Question 6**

This number square has some numbers missing.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	.....	30	36	42	48	54	60
7	14	.....	.....	.....	42	49	56	63	70
8	16	24	.....	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

- (a) Write the missing numbers in the number square.
- (b) Describe the number pattern in the shaded column.

---

**Question 7**

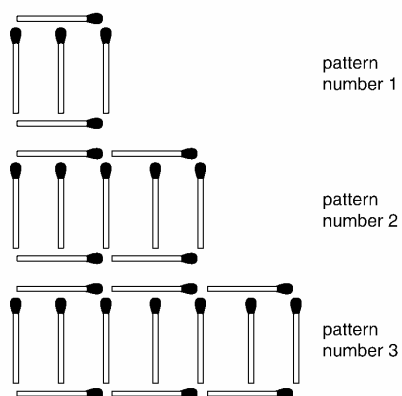
- (a) Write down the next two numbers in this number sequence.

1, 7, 13, 19, 25, ....., .....

- (b) Write down a number in the sequence that divides exactly by 5.

### Question 8

Here are some patterns made out of matchsticks.



- (a) Draw a diagram of pattern number 4.
- (b) Complete the table to show the number of matchsticks needed for pattern number 4 and pattern number 5.

pattern number	number of matchsticks
1	5
2	9
3	13
4	
5	

- (c) Work out the pattern number that needs exactly 41 matchsticks.
- (d) i) How many matchsticks are needed for pattern number 100?  
 ii) Describe how you found this answer.

---

**Question 9**

Below is a number sequence.

28, 25, 22, 19, 16, .....

- (a) Write down the next two numbers in this sequence.
- (b) Describe how you found your answers in part a).

---

**Question 10**

Here are the first five numbers in a simple number sequence.

1, 3, 7, 13, 21, ....., .....

- (a) Write down the next two numbers in the sequence.
- (b) Describe, in words, the rule to continue this sequence.

---

**Question 11**

- (a) Write in the missing numbers in the following sequence.

2, 5, 8, 11, 14, ....., ....., 23,

- (b) Work out the 12<sup>th</sup> number in the sequence.
- (c) Work out an algebraic expression for the n<sup>th</sup> term in the sequence.

---

**Question 12**

Simplify

i)  $2x + 3x$

ii)  $h \times h \times h \times h \times h$

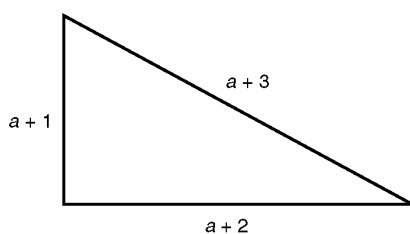
iii)  $2m \times 3n$

iv)  $2(x + 3) = 5(x - 3)$

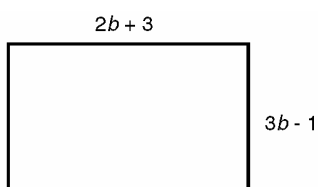
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**Question 13**

- (a) Write down and simplify an algebraic expression for the perimeter of this triangle.



- (b) Write down and simplify an algebraic expression for the perimeter of this rectangle.

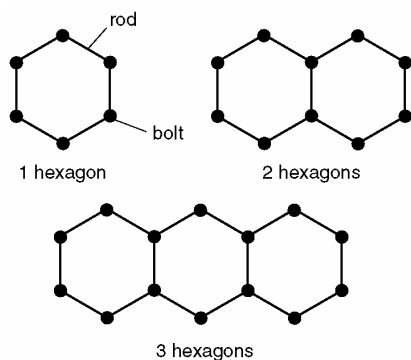




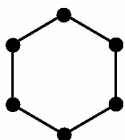
### Question 14

Rods can be fixed together using bolts.

The diagrams show rods fixed together to form a pattern of hexagons in a row.



- (a) Complete the diagram below to show how rods can be fixed together to form a pattern of 4 hexagons in a row.

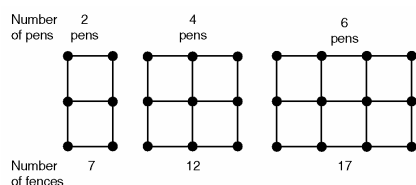


- (b) Complete the table

Number of hexagons	1	2	3	4	5	6	7
Number of bolts	6	10	14				

### Question 15

Mr McDonald is making sheep pens. He uses fences to make pens as shown in the diagram below. The pens are arranged in pairs in a row.



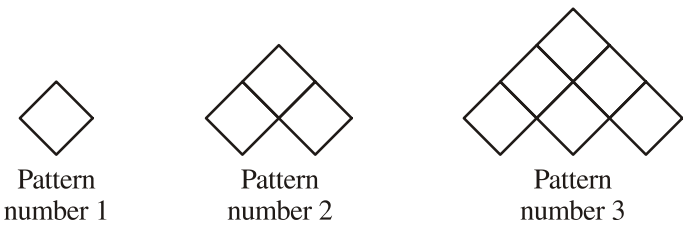
- (a) Draw diagrams to show the number of fences needed for
- 8 pens,
  - 10 pens.
- (b) Explain how you could work out the number of fences needed for twelve pens, without drawing a diagram.
- (c) Complete the table.

Number of fences	2	4	6	8	10	12	14	16
Number of pens	7	12	17					

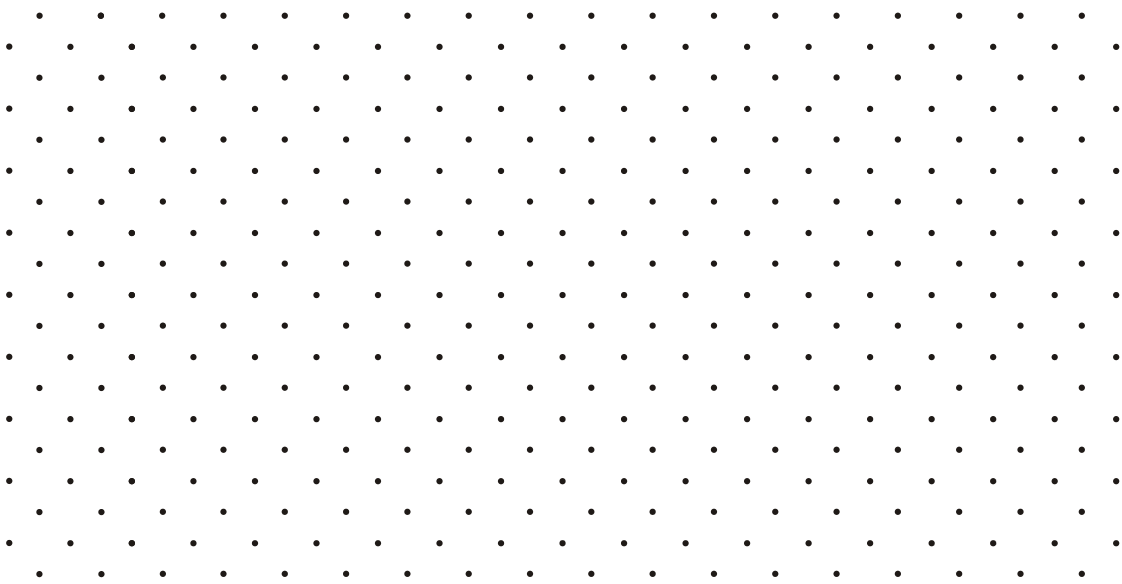
- (d) Work out the number of fences needed for 30 pens.

Question 16

Here are some patterns made out of tiles.



(a) Draw pattern no. 4 and pattern no. 5 (1 mark)



(b) Complete the table. (2 marks)

Pattern number	1	2	3	4	5	6	7
Number of tiles	1	3	6				

(c) i) How many tiles are needed for pattern number 12?  
ii) Explain how you found this answer. (3 marks)

---

**Question 17**

Simplify  $5a - 3(a + b)$ .

**(2 marks)**

---

**Question 18**

Here are the first four terms in a simple sequence.

6, 12, 18, 24.

- (a) Write down the 5<sup>th</sup> term in the sequence.
- (b) Which term in the sequence is equal to 72?
- (c) Write down an expression, in terms of  $n$ , for the  $n$ th term in the sequence.

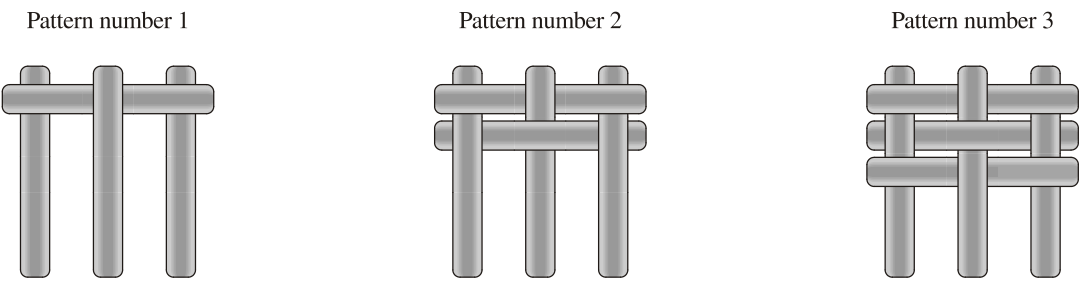
**(1 mark)**

**(2 marks)**

**(1 mark)**

Question 19

Chetna makes patterns using sticks.



Complete the table for Pattern Number 6 and  $n$ .


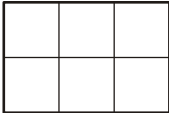
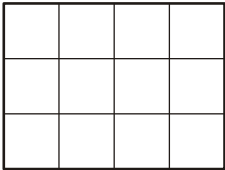
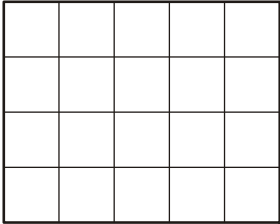
Pattern Number	Number of lollipop sticks
1	4
2	5
3	6
4	7
6	
$n$	

(3 marks)

---

**Question 20**

The diagram shows patterns made from square tiles.

Diagram	Number of tiles
	2
	6
	12
	20

The numbers 2, 6, 12, 20, ... form a number sequence.

Work out the eighth number in this sequence.

**(1 mark)**