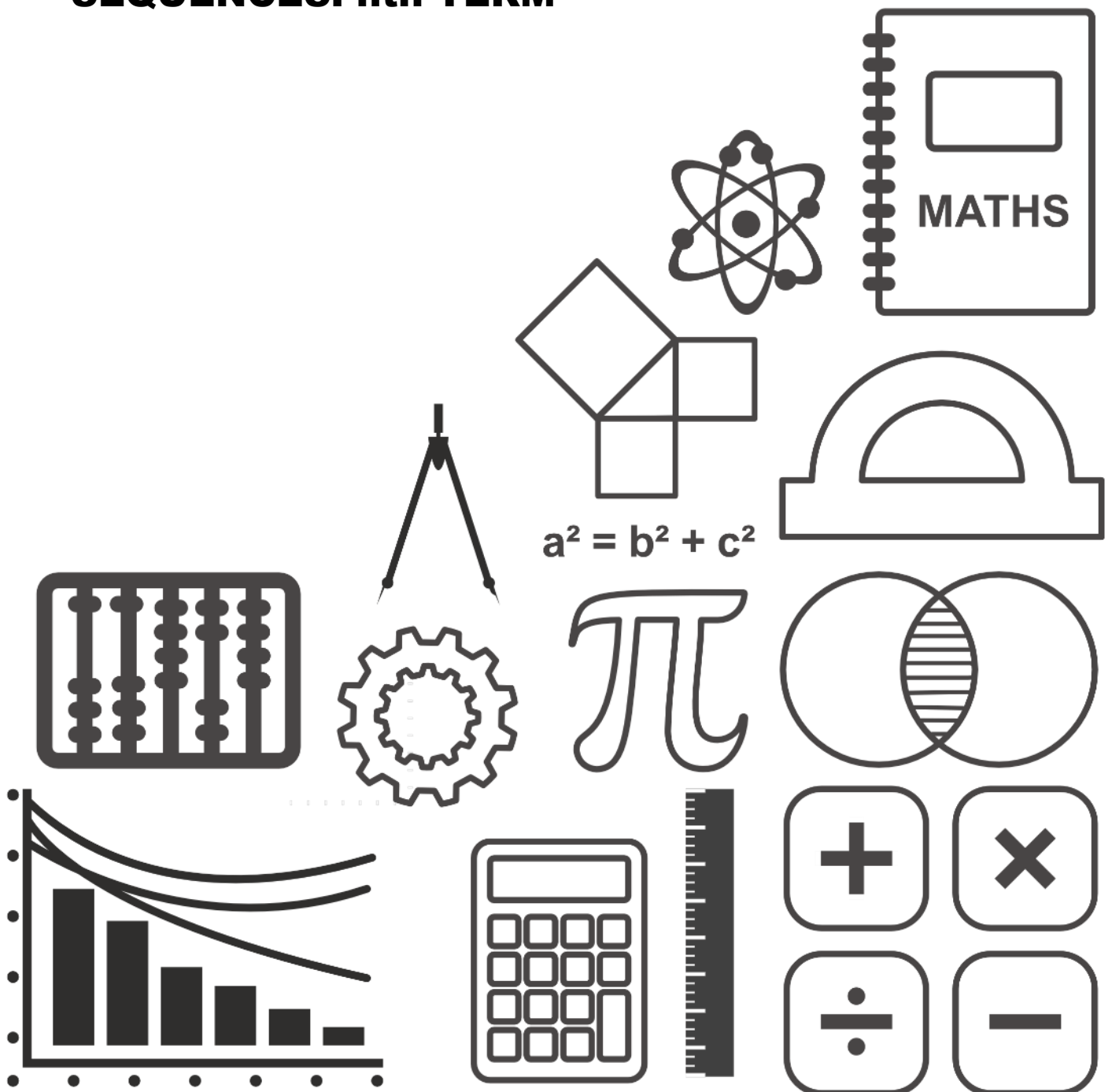


# MATHS DIY

## GCSE TOPIC BOOKLET SEQUENCES: nth TERM



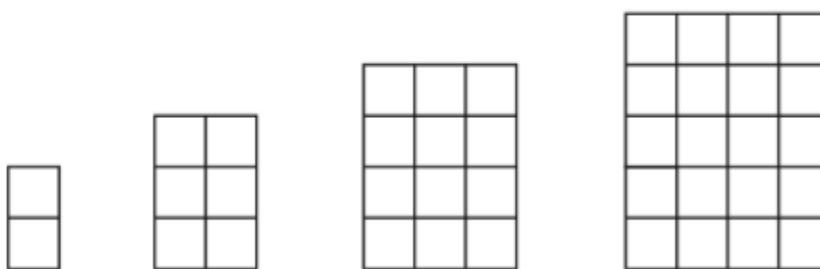
1. Write down the  $n$ th term for the sequence 5, 14, 23, 32, 41, .....

.....  
 ..... [2]

2. (a) Write down the  $n$ th term of the sequence 5, 9, 13, 17, 21, .....

.....  
 .....

(b) The diagrams show tile patterns.



Pattern 1

Pattern 2

Pattern 3

Pattern 4

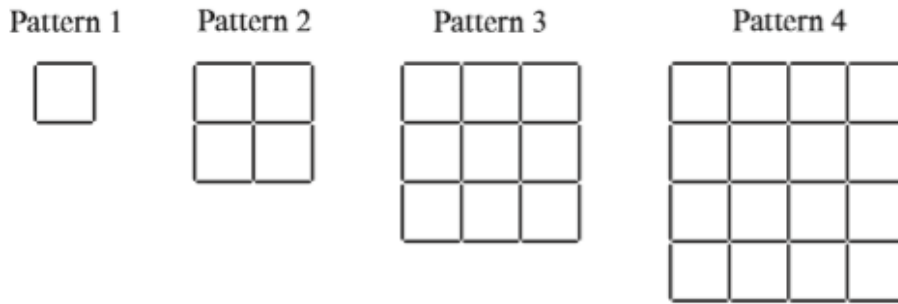
Find an expression for the number of tiles in Pattern  $n$ .

.....  
 .....  
 .....  
 ..... [2]

3. The  $n$ th term of a sequence is  $n^2 + 10$ . Write down the first three terms of this sequence.

.....  
 ..... [2]

4. Square patterns are made using matchsticks.  
A matchstick can be placed horizontally — or vertically | .



There are 12 matchsticks in Pattern 2.

(a) Complete the following table.

Pattern Number	Number of horizontal matchsticks	Number of vertical matchsticks	Total number of matchsticks
1	2	2	4
2			12
3			24
4			

[1]

(b) (i) Find how many **horizontal** matchsticks are in Pattern 7.

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.....

.....

(ii) State how many **vertical** matchsticks are in Pattern 7.

.....

.....

[2]

(c) Find how many **vertical** matchsticks are in Pattern 10.

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.....

[1]

- (d) Find the rule, in terms of  $n$ , for working out how many vertical matchsticks are in Pattern  $n$ .

.....

.....

.....

.....

[2]

5. a) The diagram below shows a number machine.



Write down the OUTPUT when the INPUT is  $n$ .

.....

.....

[1]

- b) (i) Find the  $n$ th term of a sequence 5, 12, 19, 26, 33, ...

.....

.....

.....

- (ii) The  $n$ th term of a sequence is  $n^2 - 2$ . Find the value of the twentieth term of the sequence.

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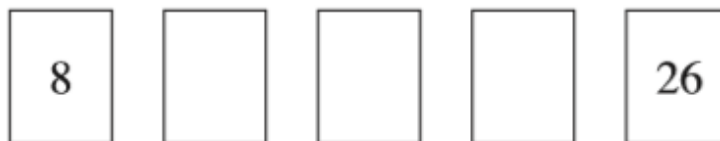
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[4]

6. (a) A sequence starts with 8.  
Equal amounts are added each time to get the next term.  
Write down the three missing terms of the sequence.

[3]




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- (b) The  $n$ th term of a sequence is  $n^2 - 3$ . Write down the first three terms of this sequence.

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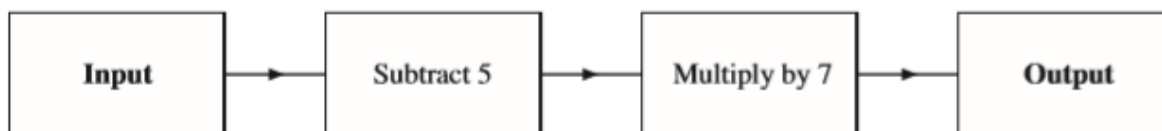
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[2]

- (c) The diagram shows a number machine.



- (i) Find the **Input** to the number machine when the **Output** is  $-49$ .

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- (ii) Write down the **Output** from the number machine when the **Input** is  $n$ .

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[3]

(d) Write down the  $n$ th term of the sequence 8, 13, 18, 23, 28, .....

.....

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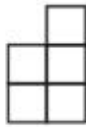
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[2]

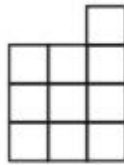
(e) The diagrams show tile patterns.



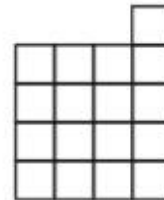
Pattern 1



Pattern 2



Pattern 3



Pattern 4

Find an expression for the number of tiles in Pattern  $n$ .

.....

.....

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.....

.....

[2]

7. The  $n$ th term of a sequence is  $n^2 - 6$ . Find the first three terms of the sequence.

.....

.....

.....

.....

[2]

8. Here is a sequence of numbers.

267            259            251            243            .....

(a) What is the first number in the sequence that is less than zero?

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.....

.....

.....

.....

.....

[3]

(b) Find the  $n$ th term of the sequence.

.....

.....

[2]

9. Write down the  $n$ th term of the sequence 1, 4, 9, 16, 25, ...

.....

[1]

10. The  $n$ th term of a sequence is  $n^2 + 3$ .  
Write down the first three terms of the sequence.

.....

.....

.....

[2]

11. Write down the  $n$ th term of the sequence 8, 15, 22, 29, 36, ...

.....

.....

.....

[2]

12. (a) Write down the  $n$ th term of the sequence 9, 17, 25, 33, 41, ...

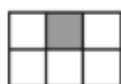
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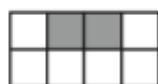
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[2]

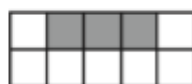
(b) The diagrams show tile patterns.  
Each pattern has some shaded tiles and some white tiles.



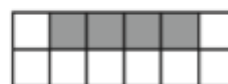
Pattern 1



Pattern 2



Pattern 3



Pattern 4

(i) Find an expression for the number of shaded tiles in Pattern  $n$ .

.....

(ii) Find an expression for the number of white tiles in Pattern  $n$ .

.....

.....

.....

.....

.....

[3]

13. (a) Find the  $n$ th term of the sequence 4, 10, 16, 22, 28, ...

.....

.....

.....

[2]

(b) The  $n$ th term of a sequence is  $n^2 + 7$ . Find the value of the 20th term of the sequence.

.....

.....

.....

[2]



14. (a) Find the  $n$ th term of the sequence 7, 10, 13, 16, 19, .....

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.....

[2]

(b) Find the  $n$ th term of the sequence 2, 5, 10, 17, 26, .....

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.....

.....

[2]

15. (a) The diagram below shows a number machine.



Write down the **OUTPUT** when the **INPUT** is  $n$ .

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.....

[1]

(b) Find the  $n$ th term of the sequence 1, 7, 13, 19, 25, ...

.....

.....

.....

[2]

(c) The  $n$ th term of a sequence is  $n^2 + 6$ .  
Find the value of the 15th term of the sequence.

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.....

[2]

16. Write down, in terms of  $n$ , the  $n$ th term of **each** of the following sequences.

(a) 3      7      11      15      19      .....

.....

.....

..... [2]

(b)  $1 \times 3$      $2 \times 4$      $3 \times 5$      $4 \times 6$     .....

.....

.....

..... [2]

17. Write down the  $n$ th term for the sequence 5, 14, 23, 32, 41, .....

.....

..... [2]

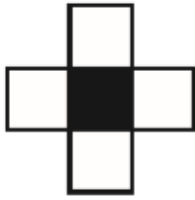
18. Write down the  $n$ th term of the sequence 6, 10, 14, 18, 22, ...

.....

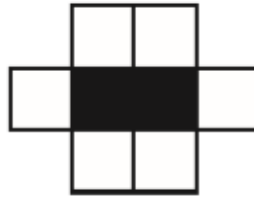
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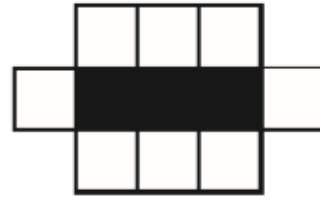
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Pattern 1



Pattern 2



Pattern 3

Complete the following table.

Pattern number	Number of black squares	Number of white squares
1	1	4
2	2	6
3	3	8

15		
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100		
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$n$		
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[5]