

GCSE QUESTIONS

Q1. NON-CALCULATOR

Here are the first five terms of a sequence.

2

8

18

32

50

(a) Find the next term of this sequence.

.....
(1)

The n th term of a different sequence is $3n^2 - 10$

(b) Work out the 5th term of this sequence.

.....
(1)
(Total for question = 2 marks)

Q2. NON-CALCULATOR

Here are the first 7 terms of a quadratic sequence.

3

6

11

18

27

38

51

(a) Find an expression, in terms of n , for the n th term of this sequence.

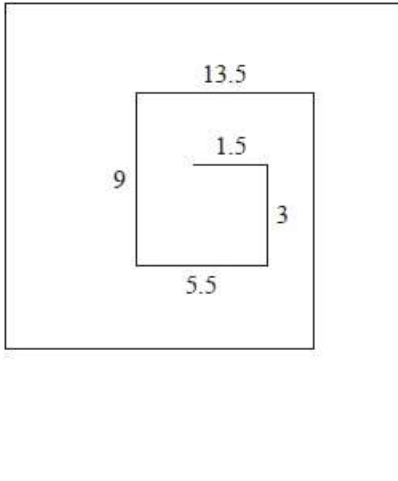
.....
(2)

(b) Find the 50th term of this sequence.

.....
(1)
(Total for question = 3 marks)

Q3. NON-CALCULATOR

The diagram shows the first 10 sides of a spiral pattern.
It also gives the lengths, in cm, of the first 5 sides.



The lengths, in cm, of the sides of the spiral form a sequence.

Find an expression in terms of n for the length, in cm, of the n th side.

.....
(Total for question = 3 marks)

Q4. CALCULATOR ALLOWED

The n th term of a number sequence is $n^2 + 7$

(a) Find the first three terms of this sequence.

..... (2)

128 is a term of this sequence.

(b) Which term?

..... (1)

(Total for question = 3 marks)

Q5. CALCULATOR ALLOWED

The first three terms of a number pattern are 1 2 4

Hester says the first five terms of this number pattern are 1 2 4 8 16

(a) Write down the rule Hester could have used to get the 4th and 5th terms.

..... (1)

(b) Write down the 6th term of Hester's number pattern.

..... (1)

Jack uses a different rule.

He says the first six terms of the number pattern are 1 2 4 7 11 16

(c) Write down the 7th and 8th terms of Jack's number pattern.

....., (1)

(Total for question = 3 marks)

Q6. CALCULATOR ALLOWED

Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

Find an expression, in terms of n , for the n th term of this quadratic sequence.

.....
(Total for question is 3 marks)

Q7. CALCULATOR ALLOWED

Here are the first five terms of a sequence.

4 11 22 37 56

Find an expression, in terms of n , for the n th term of this sequence.

.....
(Total for question = 3 marks)

Q8. CALCULATOR ALLOWED

Here are the first six terms of a quadratic sequence.

-1 5 15 29 47 69

Find an expression, in terms of n , for the n th term of this sequence.

.....
(Total for question = 3 marks)

Q9. CALCULATOR ALLOWED

Here are the first four terms of a quadratic sequence.

3 8 15 24

(a) Find an expression, in terms of n , for the n th term of this sequence.

.....
(3)

The n th term of a different sequence is $2^n + 5$

(b) Show that 36 is **not** a term of this sequence.

.....
.....

(1)
(Total for question = 4 marks)

Q10. CALCULATOR ALLOWED

The n th term of a sequence is given by $an^2 + bn$ where a and b are integers.

The 2nd term of the sequence is -2

The 4th term of the sequence is 12

(a) Find the 6th term of the sequence.

.....
(4)

Here are the first five terms of a different quadratic sequence.

0 2 6 12 20

(b) Find an expression, in terms of n , for the n th term of this sequence.

.....

(2)

(Total for question = 6 marks)

Q11. CALCULATOR ALLOWED

In 2016 the population of the UK was 6.5×10^7

Laura wants to calculate an estimate for the population of the UK in 2020
She assumes that the population increases by 0.6% each year.

(a) Using Laura's assumption, calculate an estimate for the population of the UK in 2020

.....

(2)

Kieran also assumes that the population of the UK increases by 0.6% each year.

$$\frac{50}{0.6} = 83.\dot{3}$$

He says that it will take over 80 years for the population to increase by 50% because

Kieran's method is wrong.

(b) Explain what is wrong with his method.

.....
.....

(1)

Assuming that the population of the UK increases by 0.6% each year,

(c) show that the population of the UK each year forms a geometric progression.

(2)
(Total for question = 5 marks)

Q12. CALCULATOR ALLOWED

The number of animals in a population at the start of year t is P_t
The number of animals at the start of year 1 is 400

Given that

$$P_{t+1} = 1.01P_t$$

work out the number of animals at the start of year 3

.....
(Total for question = 2 marks)

Q13. CALCULATOR ALLOWED

Here are the first five terms of a Fibonacci sequence.

3 3 6 9 15

(a) Write down the next two terms of the sequence.

..... ,
(1)

The first three terms of a different Fibonacci sequence are

a a $2a$

(b) Find the 6th term of this sequence.

.....
(2)
(Total for question = 3 marks)

Q14. CALCULATOR ALLOWED

Here are the first six terms of a Fibonacci sequence.

1 1 2 3 5 8

The rule to continue a Fibonacci sequence is,

the next term in the sequence is the sum of the two previous terms.

(a) Find the 9th term of this sequence.

.....
(1)

The first three terms of a different Fibonacci sequence are

a b $a + b$

(b) Show that the 6th term of this sequence is $3a + 5b$

(2)

Given that the 3rd term is 7 and the 6th term is 29,

(c) find the value of a and the value of b .

$a =$

$b =$

(3)

(Total for question = 6 marks)

Q15. CALCULATOR ALLOWED

S is a geometric sequence.

- (a) Given that $(\sqrt{x} - 1)$, 1 and $(\sqrt{x} + 1)$ are the first three terms of S, find the value of x.

You must show all your working.

- (b) Show that the 5th term of S is $7 + 5\sqrt{2}$

.....
(3)

(2)
(Total for question = 5 marks)