SEQUENCES (NTH TERM)

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

1.

1 The first five terms of an arithmetic sequence are

1 4 7 10 13

Write down an expression, in terms of n, for the nth term of this sequence.

.....

(Total for Question 1 is 2 marks)

Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

2.

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

10 21 38 61 90

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

.....

(Total for Question 16 is 3 marks)

Pearson Edexcel - Tuesday 11 June 2019 - Paper 3 (Calculator) Higher Tier

3.

16 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 nth term of this sequence.

.....

(Total for Question 16 is 3 marks)

Pearson Edexcel - Tuesday 12 June 2018 - Paper 3 (Calculator) Higher Tier

4.

16 The nth 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 nth term of this sequence.

.....

(2)

(Total for Question 16 is 6 marks)

Pearson Edexcel - Monday 6 November 2017 - Paper 2 (Calculator) Higher Tier

5.

23 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.

.....

(3)

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

(2)

(Total for Question 23 is 5 marks)

Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

6.

22 Here are the first five terms of a sequence.

4 11 22 37 56

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

.....

(Total for Question 22 is 3 marks)

Pearson Edexcel - Tuesday 13 June 2017 - Paper 3 (Calculator) Higher Tier

7.

16 Using $x_{n+1} = -2 - \frac{4}{x_n^2}$

with $x_0 = -2.5$

(a) find the values of x_1, x_2 and x_3

$x_1 =$.....

$x_2 =$.....

$x_3 =$.....

(3)

(b) Explain the relationship between the values of x_1, x_2 and x_3 and the equation $x^3 + 2x^2 + 4 = 0$

.....

.....

.....

.....

(2)

(Total for Question 16 is 5 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

8.

13 The number of slugs in a garden t days from now is p_t where

$p_0 = 100$

$p_{t+1} = 1.06p_t$

Work out the number of slugs in the garden 3 days from now.

.....

(Total for Question 13 is 3 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 2 (Calculator) Higher Tier

9.

17 Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

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

.....

(Total for Question 17 is 3 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 2 (Calculator) Higher Tier

10.

21 The number of bees in a beehive at the start of year n is P_n.
The number of bees in the beehive at the start of the following year is given by

$$P_{n+1} = 1.05(P_n - 250)$$

At the start of 2015 there were 9500 bees in the beehive.

How many bees will there be in the beehive at the start of 2018?

.....

(Total for Question 21 is 3 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier

11.

21 (a) Show that the equation $3x^2 - x^3 + 3 = 0$ can be rearranged to give

$$x = 3 + \frac{3}{x^2}$$

(2)

(b) Using

$$x_{n+1} = 3 + \frac{3}{x_n^2} \quad \text{with } x_0 = 3.2,$$

find the values of x_1, x_2 and x_3

(3)

(c) Explain what the values of x_1, x_2 and x_3 represent.

(1)

(Total for Question 21 is 6 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier

12.

22 Here are the first five terms of an arithmetic sequence.

7 13 19 25 31

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 24

(Total for Question 22 is 6 marks)

Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier

13.

3 Here are the first four terms of an arithmetic sequence.

6 10 14 18

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

.....

(2)

The nth term of a different arithmetic sequence is $3n + 5$

(b) Is 108 a term of this sequence?
Show how you get your answer.

(2)

(Total for Question 3 is 4 marks)

Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier

14.

3 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.

.....

(3)

(Total for Question 3 is 6 marks)

Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier

15.

3 Here are the first four terms of an arithmetic sequence.

11 17 23 29

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

.....

(2)

(b) Is 121 a term of this arithmetic sequence?
You must explain your answer.

.....

.....

.....

(2)

(Total for Question 3 is 4 marks)

Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier

16.

7 Here are the first five terms of an arithmetic sequence.

2 6 10 14 18

(a) Write down an expression, in terms of n, for the nth term of this sequence.

.....

(2)

*(b) Is 86 a term in the sequence?
You must give a reason for your answer.

(1)

(Total for Question 7 is 3 marks)

Pearson Edexcel - Friday 13 June 2014 - Paper 2 (Calculator) Higher Tier

17.

12 Here are the first five terms of an arithmetic sequence.

4 9 14 19 24

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

.....

(2)

Here are the first five terms of a different sequence.

2 2 0 –4 –10

An expression for the nth term of this sequence is $3n - n^2$

(b) Write down, in terms of n, an expression for the nth term of a sequence whose first five terms are

4 4 0 –8 –20

.....

(1)

(Total for Question 12 is 3 marks)

Pearson Edexcel - Friday 8 November 2013 - Paper 2 (Calculator) Higher Tier

18.

8 Here are the first four terms of an arithmetic sequence.

3 10 17 24

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

.....

(2)

(b) Is 150 a term of this sequence?

You must explain how you get your answer.

.....

.....

.....

.....

.....

(2)

(Total for Question 8 is 4 marks)

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

19.

5 Here are the first 5 terms of an arithmetic sequence.

3 9 15 21 27

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

.....

(2)

Ben says that 150 is in the sequence.

(b) Is Ben right?
You must explain your answer.

.....

.....

.....

(1)

(Total for Question 5 is 3 marks)

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

20.

1. Here are the first five terms in a number sequence.

5 9 13 17 21

Find the 10th term in this number sequence.

.....

(Total 2 marks)

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

21.

2. Here is a number pattern.

Line Number			
1	$1^2 + 3^2$	$2 \times 2^2 + 2$	10
2	$2^2 + 4^2$	$2 \times 3^2 + 2$	20
3	$3^2 + 5^2$	$2 \times 4^2 + 2$	34
4	.....	.....	52
10	.....	.....	.....

(a) Complete Line Number 4 of the pattern.

(1)

(b) Complete Line Number 10 of the pattern.

(2)

(c) Use the number pattern to find the answer to $999^2 + 1001^2$

.....

(2)

(Total 5 marks)

Pearson Edexcel - Monday 6 June 2011 - Paper 3 (Non-Calculator) Higher Tier

22.

9. The nth term of a number sequence is given by $3n+1$

(a) Work out the first **two** terms of the number sequence.

.....

(1)

Here are the first four terms of another number sequence.

1 5 9 13

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

.....

(2)

(Total 3 marks)

Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

23.

4. Here are the first five terms of an arithmetic sequence.

2 6 10 14 18

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

.....

(2)

(b) An expression for the nth term of another sequence is $10 - n^2$

(i) Find the third term of this sequence.

.....

(ii) Find the fifth term of this sequence.

.....

(2)

(Total 4 marks)

OCR GSCE – Monday 9 November 2020 – Paper 6 (Calculator) Higher Tier

24.

17 Here is a sequence.

$3 \qquad 3\sqrt{5} \qquad 15 \qquad 15\sqrt{5}$

(a) Work out the next term.

(a) ..... **[1]**

(b) Find the *n*th term.

(b) ..... **[3]**

OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier

25.

11 A sequence is defined by the rule $u_{n+1} = 5u_n - 15$.

(a) If $u_3 = 6$, calculate

(i) u_5

(a)(i) $u_5 =$ ..... **[3]**

(ii) u_2

(ii) $u_2 =$ ..... **[3]**

(b) Trevor says

If $u_1 = 3.75$ then $u_{100} = 3.75$

Show that Trevor is correct. **[2]**

OCR GSCE – Tuesday 21 May 2019 – Paper 4 (Calculator) Higher Tier

26.

12 (a) Here are the first four terms of a sequence.

-1 4 9 14

Write an expression for the nth term of this sequence.

(a) ..... **[2]**

(b) The nth term of another sequence is given by

$an^2 + bn$

The third term is 9 and the sixth term is 126.

Find the value of a and the value of b.

(b) a = ...

b = ... **[5]**

OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

27.

17 Here are the first four terms of a quadratic sequence.

2 15 34 59

The nth term is $an^2 + bn + c$.

Find the values of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... **[4]**

OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

28.

16 Here is a sequence.

$5 \qquad 5\sqrt{3} \qquad 15 \qquad 15\sqrt{3}$

(a) Work out the next term.

(a) ..... **[1]**

(b) Find the *n*th term.

(b) ..... **[3]**

OCR GSCE – Monday 12 November 2018 – Paper 6 (Calculator) Higher Tier

29.

15 Use the formula $x_{n+1} = \frac{(x_n)^3}{30} + 2$ with $x_1 = 2$ to calculate x_2 and x_3.
Round your answers correct to 4 decimal places.

x_2 = ... and x_3 = ... **[3]**

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

30.

19 Here are the first four terms of a quadratic sequence.

0 9 22 39

The nth term can be written as $an^2 + bn + c$.

Find the values of a, b and c.

$a =$ .....

$b =$ .....

$c =$ .....

[4]

OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

31.

2 **(a)** Write the next term in each of these sequences.

(i) 1 1 2 3 5 8

(a)(i) .....**[1]**

(ii) 2 4 8 16 32 64

(ii) .....**[1]**

(b) Write an expression for the *n*th term of the sequence below.

15 12 9 6

(b) .....**[2]**

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

32.

12 (a) A sequence is defined using this term-to-term rule.

$$u_{n+1} = \sqrt{2u_n + 15}$$

If $u_1 = 5$, find u_2.

(a) ..... **[1]**

(b) Another sequence is defined using this term-to-term rule,

$$u_{n+1} = ku_n + r$$

where k and r are constants.

Given that $u_2 = 41$, $u_3 = 206$ and $u_4 = 1031$, find the value of k and the value of r.

(b) k = ...

r = ... **[5]**

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

33.

19 (a) Here are the first four terms of a sequence.

$$\frac{1}{2} \qquad \frac{4}{3} \qquad \frac{9}{4} \qquad \frac{16}{5}$$

Find the nth term of this sequence.

(a) ..... **[2]**

(b) Here are the first four terms of a quadratic sequence, the nth term of this quadratic sequence is $an^2 + bn + c$.

2 12 28 50

Find the values of a, b and c.

(b) $a =$ .....

$b =$ .....

$c =$ .....

[4]

OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

34.

19 A sequence is defined by the term-to-term rule $u_{n+1} = u_n^2 - 8u_n + 17$.

(a) Given that $u_1 = 4$, find u_2 and u_3.

(a) .... **[2]**

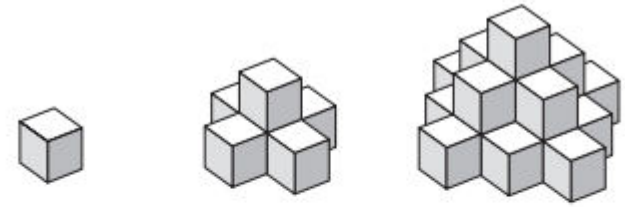
(b) Given instead that $u_1 = 2$, find u_2, u_3 and u_{100}.

(b) .... **[3]**

OCR GSCE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

35.

10 Here is a picture of three towers.
Not all the cubes can be seen in the towers.



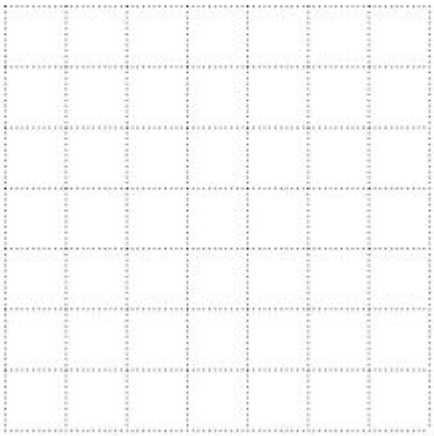
Tower 1 Tower 2 Tower 3

Edith uses 1 cube to build tower 1.
Edith uses 6 cubes to build tower 2. There are 5 cubes on the bottom layer.

(a) Write down the total number of cubes in tower 3.

(a) ..... **[1]**

(b) Draw a plan view of the arrangement of cubes Edith will use for the bottom layer of tower 4.



[1]

(c) Continue this sequence to show the number of cubes used for the bottom layer of each tower.

Tower 1	Tower 2	Tower 3	Tower 4
1	5	.....	.....

[2]

(d) Find an expression for the number of cubes used in the bottom layer of tower n.

(d) ..... **[4]**

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

36.

3 **(a)** This expression can be used to generate a sequence of numbers.

$$n^2 - n + 11$$

(i) Work out the first three terms of this sequence.

(a)(i) ..... , ... , ... **[2]**

(ii) Show that this expression does not only generate prime numbers.

.....

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

(b) Marta says

odd square numbers have exactly three factors.

Give one example where this is correct and another where this is not correct.
In each case, write down the number and its factors.

Correct .....

Not correct .....

[2]

(c) Here are some properties of a number.

- It is a common factor of 288 and 360.
- It is a common multiple of 4 and 6.
- It is larger than 25.

Find the **two** possible numbers with these properties.

(c) ..... and ..... **[4]**

AQA GSCE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

36.

9 (a) All the terms of a **geometric** progression are positive.
The second and fourth terms are shown.

..... 4 16

Work out the first and third terms.

[2 marks]

First term _____

Third term _____

9 (b) The first two terms of an **arithmetic** progression are shown.

p $5p$ .....

The sum of the first three terms is 90

Work out the value of p.

[3 marks]

Answer _____

AQA GSCE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

37.

16 A sequence of numbers is formed by the iterative process

$$u_{n+1} = \frac{4}{u_n - 1} \qquad u_1 = 9$$

Work out the values of u_2 and u_3

[2 marks]

$u_2 =$ _____

$u_3 =$ _____

AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

38.

12 The next term of a sequence is made by adding the previous two terms.

Which of these sequences follows this rule?

Circle your answer.

[1 mark]

–9 2 –7 –5 –12

–3 5 –2 3 1

0 –3 –3 0 –3

–1 –1 –2 –3 1

AQA GSCE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier

39.

21 Here are the first four terms of a quadratic sequence.

11 26 45 68

Work out an expression for the nth term.

[3 marks]

Answer _____

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

40.

3 Which of these is a geometric progression?

Circle your answer.

[1 mark]

1 3 5 7 9

1 3 6 10 15

1 4 9 16 25

1 3 9 27 81

AQA GSCE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

41.

3 The first 4 terms of a linear sequence are

3 11 19 27

Circle the expression for the nth term.

[1 mark]

$8 - 5n$ $n + 8$ $8n + 3$ $8n - 5$

AQA GSCE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

42.

22 An approximate solution to an equation is found using the iterative formula

$$x_{n+1} = \frac{(x_n)^3 - 2}{10} \quad \text{with} \quad x_1 = -1$$

22 (a) Work out the values of x_2 and x_3

[2 marks]

$x_2 =$ _____

$x_3 =$ _____

22 (b) Work out the solution to 5 decimal places.

[1 mark]

$x =$ _____

AQA GSCE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

43.

20 A linear sequence starts

$a + 2b$ $a + 6b$ $a + 10b$ …….. ……..

The 2nd term has value 8

The 5th term has value 44

Work out the values of a and b.

[4 marks]

$a =$ _____

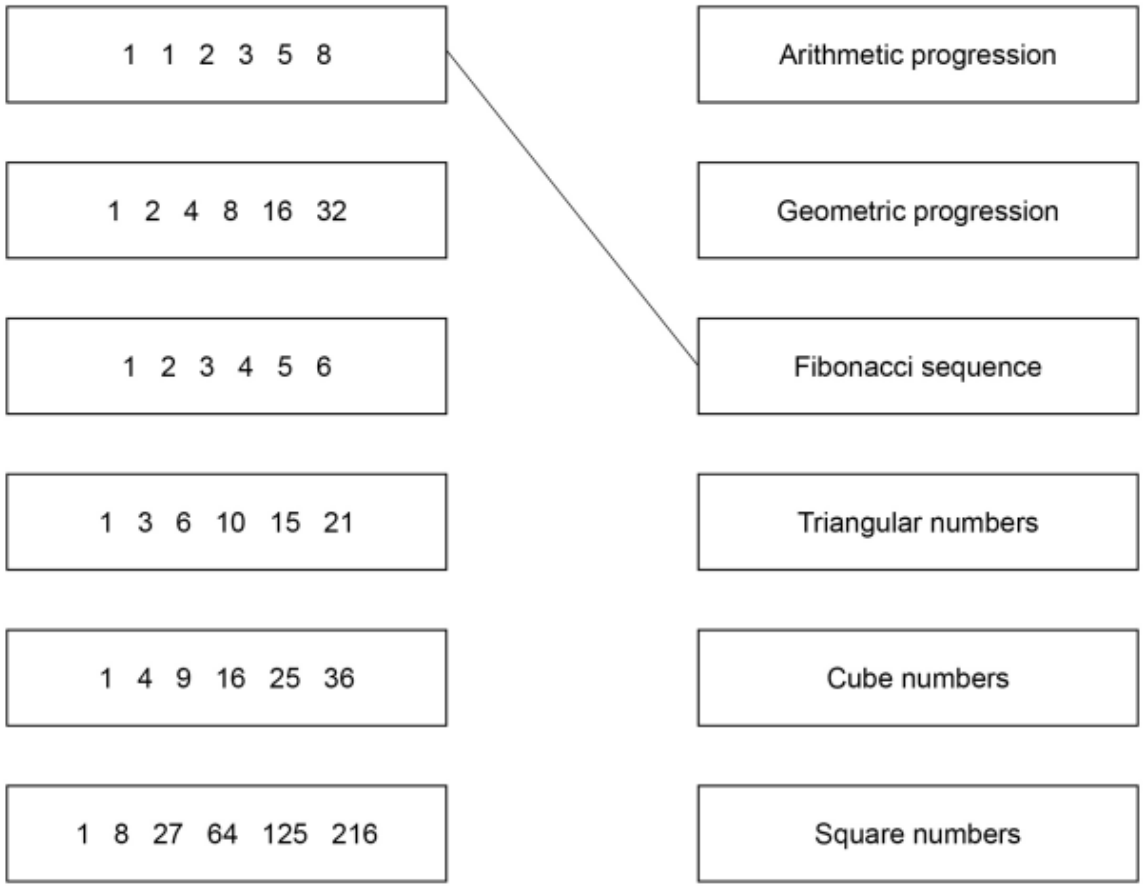
$b =$ _____

AQA GSCE – Thursday 7 June 2018 – Paper 2 (Calculator) Higher Tier

44.

5 Match each sequence to its description.
One has been done for you.

[4 marks]



AQA GSCE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier

45.

10 The nth term of a sequence is $12n - 5$

Work out the numbers in the sequence that

have two digits

and

are **not** prime.

[3 marks]

Answer _____

AQA GSCE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier

46.

23 A sequence of numbers is formed by the iterative process

$$u_{n+1} = \frac{3}{u_n + 1}, \qquad u_1 = 4$$

Work out the values of u_2 and u_3

[2 marks]

$u_2 =$ _____

$u_3 =$ _____

AQA GSCE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

47.

10 Work out the next term of this quadratic sequence.

[2 marks]

5 8 14 23 .....

Answer

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

48.

3 The first four terms of a sequence are –10 –8 –6 –4

Circle the expression for the nth term of the sequence.

[1 mark]

$-12 - 2n$ $-8 - 2n$ $n + 2$ $2n - 12$

AQA GSCE – Wednesday 25 May 2017 – Paper 1 (Non - Calculator) Higher Tier

49.

3 Which of these is a geometric progression?

Circle your answer.

[1 mark]

2, 4, 6, 8, 10 2, 3, 5, 8, 12

2, 6, 18, 54, 162 2, 6, 10, 14, 18

AQA GSCE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

50.

4 Here is a sequence.

90 82 74 66 58

Circle the expression for the nth term of the sequence.

[1 mark]

$n - 8$ $98 - 8n$ $8n + 82$ $8n - 98$

AQA GSCE – Tuesday 13 June 2017 – Paper 3 (Calculator) Higher Tier

51.

22 Work out an expression for the nth term of the quadratic sequence

2 17 40 71 ....

Give your answer in the form $an^2 + bn + c$ where a, b and c are constants.

[3 marks]

Answer _____

AQA GSCE – Sample Paper 1 (Non - Calculator) Higher Tier

52.

9 The nth term of a sequence is $2n + 1$

The nth term of a different sequence is $3n - 1$

Work out the **three** numbers that are

in both sequences

and

between 20 and 40

[3 marks]

Answer _____ , _____ , _____

AQA GSCE – Sample Paper 2 (Calculator) Higher Tier

53.

1 Which sequence is a geometric progression?

Circle your answer.

[1 mark]

1 2 3 4 1 2 4 7

1 2 4 8 1 2 3 5

AQA GSCE – Sample Paper 3 (Calculator) Higher Tier

54.

14 (a) The nth term of a sequence is $2^n + 2^{n-1}$

Work out the 10th term of the sequence.

[1 mark]

Answer _____

14 (b) The nth term of a different sequence is $4(2^n + 2^{n-1})$

Circle the expression that is equivalent to $4(2^n + 2^{n-1})$

[1 mark]

$2^{n+2} + 2^{n+1}$ $2^{2n} + 2^{2(n-1)}$

$8^n + 8^{n-1}$ $2^{n+2} + 2^{n-1}$