A105 Non-linear sequences

Q1.

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)

Q2.

Here are the first 7 terms of a quadratic sequence.

3 6 11 18 27 38 51

(a) Find the next term in this sequence.

.....

(1)

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

(b) Work out the 6th term of this sequence.

.....

(1)

(Total for question = 2 marks)

Q3.

Here are the first six terms of an arithmetic sequence.

3 8 13 18 23 28

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

.....

(2)

The nth term of a different sequence is $3n^2$
Nathan says that the 4th term of this sequence is 144

(b) Is Nathan right?

Show how you get your answer.

(1)

(Total for question = 3 marks)

Q4.

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)

Q5.

Here are the first five terms of a sequence.

2 8 18 32 50

(a) Find the next term of this sequence.

.....

(1)

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

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

.....

(1)

(Total for question = 2 marks)

Q6.

The nth 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)

Q7.

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)

Q8.

The nth term of a sequence is $2n^2 - 1$

The nth term of a different sequence is $40 - n^2$

Show that there is only one number that is in both of these sequences.

(Total for question = 3 marks)

Q9.

Here are the first five terms of a number sequence.

2 6 18 54 162

(a) Work out the next term of the sequence.

(1)

(b) Explain how you worked out your answer.

(1)

(c) Find the nth term of this geometric sequence.

(2)

(Total for question = 4 marks)

Q10.

Here are the first five terms of a number sequence.

1 2 4 8 16

(a) Write down the next term of the sequence.

(1)

(b) Explain how you found your answer.

(1)

(c) Find the 10th term of the sequence.

(1)

(d) Find the nth term of this geometric sequence.

(2)

(Total for question = 5 marks)