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.

$$3 \quad 6 \quad 11 \quad 18 \quad 27 \quad 38 \quad 51$$

(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.

$$3 \quad 8 \quad 13 \quad 18 \quad 23 \quad 28$$

(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.

$$1 \qquad 1 \qquad 2 \qquad 3 \qquad 5 \qquad 8$$

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

$$a \qquad b \qquad a + b$$

(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.

$$3 \quad 3 \quad 6 \quad 9 \quad 15$$

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

.... , ...

(1)

The first three terms of a different Fibonacci sequence are

$$a \quad a \quad 2a$$

(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)