Quadratics and geometric sequences

Question 1

Here are the first five terms of a quadratic sequence.

0   2   6   12   20

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

nth term = ...

(2 marks)

Question 2

Here are the first five terms of an arithmetic sequence.

4   9   14   19   24

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 $3n - n^2$.

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 mark)

Question 3

Here are the first 7 terms of a quadratic sequence.

3   6   11   18   27   38   51

Find the next term in this sequence.

....

(1 mark)

Question 4

Here are the first four terms of a quadratic sequence.

3   8   15   24

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

....

(3 marks)

Question 5

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.

nth term = ...

(3 marks)

Question 6

 The diagram shows the first 10 sides of a spiral pattern.
It also gives the lengths, in cm, of the first 5 sides.
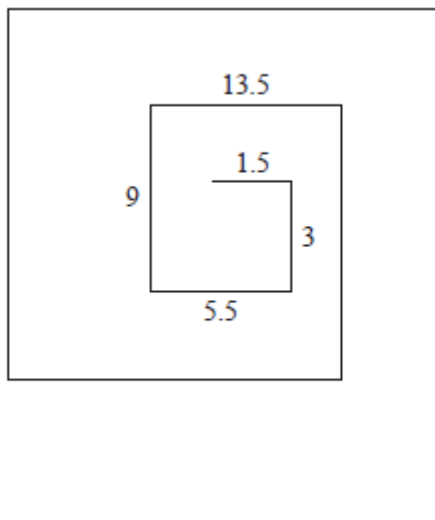
 The lengths, in cm, of the sides of the spiral form a sequence.
Find an expression in terms of n for the length, in cm, of the nth side.

.... cm

(3 marks)

Question 7

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.

....

Question 8

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

Assuming that the population of the UK increases by 0.6% each year, show that the population of the UK each year forms a geometric progression.

Input note: write down the common ratio.

....

(2 marks)

Question 9

Here are the first four terms of a sequence of fractions.

$\frac{1}{1}$　$\frac{2}{3}$　$\frac{3}{5}$　$\frac{4}{7}$

The numerators of the fractions form the sequence of whole numbers 1 2 3 4 …
The denominators of the fractions form the sequence of odd numbers 1 3 5 7 …

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

nth term = ...

(2 marks)

Question 10

S is a geometric sequence.

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

....

(3 marks)