P2 Past Paper Questions – Sequences and Series

Q1.

The 4th term of an arithmetic sequence is 3 and the sum of the first 6 terms is 27

Find the first term and the common difference of this sequence.

(Total for question = 6 marks)

Q2.

An arithmetic sequence has first term 6 and common difference 10

Find

(a) the 15th term of the sequence,

(2)

(b) the sum of the first 20 terms of the sequence. **(2)**

(Total for question = 4 marks)

Q3.

The 5th term of an arithmetic series is $4k$, where k is a constant.

The sum of the first 8 terms of this series is $20k + 16$

(a) (i) Find, in terms of k, an expression for the common difference of the series.

   (ii) Show that the first term of the series is $16 - 8k$

(6)

Given that the 9th term of the series is 24, find

(b) the value of k,

(2)

(c) the sum of the first 20 terms. **(3)**

(Total for question = 11 marks)

Q4

A sequence u_1, u_2, u_3,... is defined by

$$u_1 = 1$$
$$u_{n+1} = k - \frac{8}{u_n} \qquad n \geqslant 1$$

where k is a constant.

(a) Write down expressions for u_2 and u_3 in terms of k. **(2)**

Given that $u_3 = 6$

(b) find the possible values of k. **(4)**

(Total for question = 6 marks)

Q5.

The 4th term of a geometric series is 125 and the 7th term is 8

(a) Show that the common ratio of this series is $\dfrac{2}{5}$

(2)

(b) Hence find, to 3 decimal places, the difference between the sum to infinity and the sum of the first 10 terms of this series.

(4)

(Total for question = 6 marks)

Q6.

A cyclist aims to travel a total of 1200km over a number of days.
He cycles 12km on day 1
He increases the distance that he cycles each day by 6% of the distance cycled on the previous day, until he reaches the total of 1200km.

(a) Show that on day 8 he cycles approximately 18km.

(3)

He reaches his total of 1200km on day N, where N is a positive integer.

(b) Find the value of N.

(4)

The cyclist stops when he reaches 1200km.

(c) Find the distance that he cycles on day N. Give your answer to the nearest km.

(2)

(Total for question = 9 marks)