4.4 Sequences & Series

Question Paper

Course	Edexcel IAL Maths: Pure 2
Section	4. Sequences & Series
Topic	4.4 Sequences & Series
Difficulty	Medium

Time allowed: **30**

Score: **/26**

Percentage: **/100**

Question 1

The first k terms of a series are given by $\sum_{r=1}^{k}(7+5r)$.

(a) Show that this is an arithmetic series and determine its first term and common difference.

[2 marks]

Question 1

Given that $\sum_{r=1}^{k}(7+5r)=1190$,

(b) (i) Show that $(5k+119)(k-20)=0$

(ii) Hence find the value of k.

[3 marks]

Question 2

The first k terms of a series are given by $\sum_{r=1}^{k}5\times 2^{r}$.

(a) Show that this is a geometric series and determine its first term and common ratio.

[2 marks]

Question 2

Given that $\sum_{r=1}^{k} 5 \times 2^r = 20470$,

(b) Show that $k = \frac{\log 2048}{\log 2}$

[3 marks]

Question 2

(c) For this value of k, calculate $\sum_{r=1}^{k+3} 5 \times 2^r$.

[2 marks]

Question 3

An arithmetic series is given by $a + (a + d) + (a + 2d) + \ldots$

Given that $\sum_{n=1}^{7} (a + (n-1)d) = 91$ and $\sum_{n=1}^{10} (a + (n-1)d) = 175$, find the values of a and d.

[4 marks]

Question 4

A geometric series is given by $1 + 2x + 4x^2 + ...$

(i) Write down the common ratio, r, of the series.

(ii) Given that the series is convergent, and that $\sum_{n=1}^{\infty} (2x)^{n-1} = 19$, calculate the value of x.

[4 marks]

Question 5

The terms of a sequence are defined by $u_k = k^2$ for all $k \geq 1$.

(a) State, with a reason, whether this sequence is increasing, decreasing, or neither.

[1 mark]

Question 5

It can be shown that, for all $n \geq 1$,

$$\sum_{r=1}^{n} r^2 = \frac{n(n+1)(2n+1)}{6}$$

Using that formula,

(b) Calculate $\sum_{r=1}^{50} u_r$

[2 marks]

Question 5

(c) Find the value of $51^2 + 52^2 + 53^2 + ... + 99^2 + 100^2$, i.e. the sum of the squares of all the integers between 51 and 100 inclusive.

[3 marks]