

4.3 Geometric Sequences & Series

Question Paper

Course	Edexcel IAL Maths: Pure 2
Section	4. Sequences & Series
Topic	4.3 Geometric Sequences & Series
Difficulty	Easy

Time allowed: 40

Score: /37

Percentage: /100

Question 1

Identify which of the following are geometric sequences.

For those that are, write down the first term and the common ratio.

(i) 3, 8, 13, 18, ...

(ii) 5, 15, 45, 135, ...

(iii) 5, -10, 20, -40, ...

(iv) $\frac{1}{3}, \frac{1}{6}, \frac{1}{12}, \dots$

[4 marks]**Question 2**

(a) Evaluate

$$\sum_{r=1}^5 3(2^r)$$

[2 marks]

Question 2

(b) Evaluate

$$\sum_{r=4}^8 (-1)^r (2^r)$$

[2 marks]**Question 3**Write down a formula for the n^{th} term of each of the following geometric sequences

(i) 3, 12, 48, 192, ...

(ii) First term: $a = 5$

Common ratio: $r = -2$

(iii) $a = 16$, $r = \frac{1}{2}$

[3 marks]**Question 4**Find the 5th and 10th terms in each of the following geometric sequences

(i) $u_n = 2(3)^n$

(ii) $u_n = 10\,000(1.02)^n$

(iii) $u_n = 3^{-n}$

[3 marks]

Question 5

- (a) The 3rd and 6th terms of a geometric sequence are 10 and 270 respectively,
Find the first term and the common ratio.

[3 marks]**Question 5**

- (b) The 12th term of a geometric sequence is 16 times greater than the 8th term.
Find the possible values of the common ratio.

[2 marks]**Question 6**

- (a) Find the sum of the first 12 terms of the geometric series that has first term 5 and
common ratio $\frac{3}{2}$, giving your answer to the nearest whole number.

[2 marks]

Question 6

(b) Find the sum to infinity of the geometric series that has first term 4 and common ratio $\frac{1}{8}$.

[2 marks]**Question 7**

The first term of a geometric sequence is 2.

The 6th term of the sequence is 486.

The sum of the first n terms is 177 146.

(a) Find the common ratio.

[2 marks]**Question 7**

(b) Show that $3^n = 177\,147$.

[2 marks]

Question 7

(c) Hence find the value of n .

[2 marks]

Question 8

The first term of a geometric sequence is 6.
The sum to infinity is 8.

(a) Show that the common ratio is 0.25.

[2 marks]

Question 8

(b) Briefly explain why the geometric sequence with first term 6 and common ratio 0.25 has a sum to infinity.

[1 mark]

Question 9

A geometric series is given by

$$k(k + 1) + k(k + 1)^2 + k(k + 1)^3 + k(k + 1)^4 + \dots$$

where k is a constant such that $|k + 1| < 1$.

(a) Write down a formula for the n^{th} term of the series, in terms of k .

[1 mark]

Question 9

(b) Show that the sum to infinity is $-(k + 1)$.

[2 marks]

Question 9

(c) The sum to infinity is $-\frac{1}{4}$. Find the value of k .

[2 marks]