

# Geometric Series

45 min  
45 marks

1. The first three terms of an infinite geometric sequence are 32, 16 and 8.

(a) Write down the value of  $r$ .

(1)

(b) Find  $u_6$ .

(2)

(c) Find the sum to infinity of this sequence.

(2)

(Total 5 marks)

2. Consider the infinite geometric sequence  $3, 3(0.9), 3(0.9)^2, 3(0.9)^3, \dots$ .

(a) Write down the 10<sup>th</sup> term of the sequence. Do not simplify your answer.

(1)

(b) Find the sum of the infinite sequence.

(4)

(Total 5 marks)

3. Find the sum of the infinite geometric series

$$\frac{2}{3} - \frac{4}{9} + \frac{8}{27} - \frac{16}{81} + \dots$$

*Working:*

*Answer:*

.....

**(Total 4 marks)**

4. In a geometric series,  $u_1 = \frac{1}{81}$  and  $u_4 = \frac{1}{3}$ .

(a) Find the value of  $r$ .

**(3)**

(b) Find the smallest value of  $n$  for which  $S_n > 40$ .

**(4)**

**(Total 7 marks)**

5. Consider the infinite geometric sequence  $3000, -1800, 1080, -648, \dots$ .

(a) Find the common ratio.

(2)

(b) Find the 10<sup>th</sup> term.

(2)

(c) Find the **exact** sum of the infinite sequence.

(2)

**(Total 6 marks)**

6. A sum of \$ 5000 is invested at a compound interest rate of 6.3 % per annum.

(a) Write down an expression for the value of the investment after  $n$  full years.

(1)

(b) What will be the value of the investment at the end of five years?

(1)

(c) The value of the investment will exceed \$ 10 000 after  $n$  full years.

(i) Write down an inequality to represent this information.

(ii) Calculate the minimum value of  $n$ .

(4)

**(Total 6 marks)**

7. Consider the infinite geometric sequence 25, 5, 1, 0.2, ... .

(a) Find the common ratio.

(b) Find

(i) the 10<sup>th</sup> term;

(ii) an expression for the  $n^{\text{th}}$  term.

(c) Find the sum of the infinite sequence.

**(Total 6 marks)**

8. The first four terms of a sequence are 18, 54, 162, 486.

(a) Use all four terms to show that this is a geometric sequence.

**(2)**

(b) (i) Find an expression for the  $n^{\text{th}}$  term of this geometric sequence.

(ii) If the  $n^{\text{th}}$  term of the sequence is 1062 882, find the value of  $n$ .

**(4)**

**(Total 6 marks)**