

1 Find $\sum_{k=1}^5 \frac{1}{1+k}$. [2]

2 The terms of a sequence are given by

$$u_1 = 192,$$
$$u_{n+1} = -\frac{1}{2}u_n.$$

(i) Find the third term of this sequence and state what type of sequence it is. [2]

(ii) Show that the series $u_1 + u_2 + u_3 + \dots$ converges and find its sum to infinity. [3]

3 A sequence begins

1 2 3 4 5 1 2 3 4 5 1 ...

and continues in this pattern.

(i) Find the 48th term of this sequence. [1]

(ii) Find the sum of the first 48 terms of this sequence. [2]

4 Sequences A, B and C are shown below. They each continue in the pattern established by the given terms.

A: 1, 2, 4, 8, 16, 32, ...

B: 20, -10, 5, -2.5, 1.25, -0.625, ...

C: 20, 5, 1, 20, 5, 1, ...

(i) Which of these sequences is periodic? [1]

(ii) Which of these sequences is convergent? [1]

(iii) Find, in terms of n , the n th term of sequence A. [1]

5 Find the numerical value of $\sum_{k=2}^5 k^3$. [2]

6 (i) Find $\sum_{k=2}^5 2^k$. [2]

(ii) Find the value of n for which $2^n = \frac{1}{64}$. [1]

(iii) Sketch the curve with equation $y = 2^x$. [2]