

1 (i) An arithmetic progression has first term  $A$  and common difference  $D$ . The sum of its first two terms is 25 and the sum of its first four terms is 250.

(A) Find the values of  $A$  and  $D$ . [4]

(B) Find the sum of the 21st to 50th terms inclusive of this sequence. [3]

(ii) A geometric progression has first term  $a$  and common ratio  $r$ , with  $r \neq \pm 1$ . The sum of its first two terms is 25 and the sum of its first four terms is 250.

Use the formula for the sum of a geometric progression to show that  $\frac{r^4 - 1}{r^2 - 1} = 10$  and hence or otherwise find algebraically the possible values of  $r$  and the corresponding values of  $a$ . [5]

2 A geometric progression has a positive common ratio. Its first three terms are 32,  $b$  and 12.5.

Find the value of  $b$  and find also the sum of the first 15 terms of the progression. [5]

3 In an arithmetic progression, the second term is 11 and the sum of the first 40 terms is 3030. Find the first term and the common difference. [5]

4 The second term of a geometric sequence is 6 and the fifth term is  $-48$ .

Find the tenth term of the sequence.

Find also, in simplified form, an expression for the sum of the first  $n$  terms of this sequence. [5]

5 The third term of an arithmetic progression is 24. The tenth term is 3.

Find the first term and the common difference.

Find also the sum of the 21st to 50th terms inclusive. [5]

Simplify

- 6 (i) Find the 51st term of the sequence given by

$$\begin{aligned}u_1 &= 5, \\u_{n+1} &= u_n + 4.\end{aligned}\quad [3]$$

- (ii) Find the sum to infinity of the geometric progression which begins

$$5 \quad 2 \quad 0.8 \quad \dots \quad [2]$$

- 7 An arithmetic progression has first term 7 and third term 12.

(i) Find the 20th term of this progression. [2]

(ii) Find the sum of the 21st to the 50th terms inclusive of this progression. [3]

- 8 The second term of a geometric progression is 18 and the fourth term is 2. The common ratio is positive. Find the sum to infinity of this progression. [5]

- 9 A geometric progression has 6 as its first term. Its sum to infinity is 5.

Calculate its common ratio. [3]