Arithmetic Series

52 min
60 marks

1. The first five terms of an arithmetic sequence are shown below.

2, 6, 10, 14, 18

(a) Write down the sixth number in the sequence.

(b) Calculate the 200th term.

(c) Calculate the sum of the first 90 terms of the sequence.

(Total 8 marks)

2. The first term of an arithmetic sequence is 7 and the sixth term is 22. Find

(a) the common difference;

(2)

(b) the twelfth term;

(2)

(c) the sum of the first 100 terms.

(2)

(Total 6 marks)

3. Consider the following sequence:

$$57, 55, 53 \ldots, 5, 3$$

(a) Find the number of terms of the sequence.

(3)

(b) Find the sum of the sequence.

(3)
(Total 6 marks)

4. A concert choir is arranged, per row, according to an arithmetic sequence. There are 20 singers in the fourth row and 32 singers in the eighth row.

(a) Find the common difference of this arithmetic sequence.

(3)

There are 10 rows in the choir and 11 singers in the first row.

(b) Find the **total** number of singers in the choir.

(3)
(Total 6 marks)

5. The natural numbers: 1, 2, 3, 4, 5… form an arithmetic sequence.

(a) State the values of u_1 and d for this sequence.

(2)

(b) Use an appropriate formula to show that the sum of the natural numbers from 1 to n is given by $\frac{1}{2}n(n+1)$.

(2)

(c) Calculate the sum of the natural numbers from 1 to 200.

(2)
(Total 6 marks)

6. The fifth term of an arithmetic sequence is 20 and the twelfth term is 41.

(a) (i) Find the common difference.

(2)

(ii) Find the first term of the sequence.

(1)

(b) Calculate the eighty-fourth term.

(1)

(c) Calculate the sum of the first 200 terms.

(2)

(Total 6 marks)

7. The first four terms of an arithmetic sequence are shown below.

1, 5, 9, 13,.....

(a) Write down the nth term of the sequence.

(b) Calculate the 100th term of the sequence.

(c) Find the sum of the first 100 terms of the sequence.

(Total 4 marks)

8. Given the arithmetic sequence: $u_1 = 124$, $u_2 = 117$, $u = 110$, $u_4 = 103$, …

(a) Write down the common difference of the sequence.

(1)

(b) Calculate the sum of the first 50 terms of the sequence.

(2)

u_k is the first term in the sequence that is negative.

(c) Find the value of k.

(3)

(Total 6 marks)

9. The sixth term of an arithmetic sequence is 24. The common difference is 8.

(a) Calculate the first term of the sequence.

The sum of the first n terms is 600.

(b) Calculate the value of n.

(Total 8 marks)

10. A woman deposits \$100 into her son's savings account on his first birthday. On his second birthday she deposits \$125, \$150 on his third birthday, and so on.

(a) How much money would she deposit into her son's account on his 17th birthday?

(b) How much in total would she have deposited after her son's 17th birthday?

(Total 4 marks)