Arithmetic sequence

The n^{th} term of an arithmetic sequence	$u_n = u_1 + (n-1)d$
The sum of n terms of an arithmetic sequence	$S_n = \frac{n}{2}(2u_1 + (n-1)d) = \frac{n}{2}(u_1 + u_n)$

Examples of arithmetic sequence

1, 3, 5, 7

2, 6, 10, 14

80, 60, 40, 20

u_n is the n^{th} term

d is the common difference

d = $u_2 - u_1$ OR $u_{n+1} - u_n$

S_n is sum of n terms

1. For the arithmetic sequence,

56, 63, 70, 77, 84

Find

(a) u_1

(b) u_2

(c) common difference

(d) Numbers of term

2. For the following arithmetic sequence,

17, 9, 1, –7, –15, –23, –31

Find

(a) u_1

(b) u_2

(c) common difference

(d) Numbers of term

List the terms

1. Consider the sequence defined by $u_n = 7n - 2$.
List the first four terms of the sequence.

2. Consider the sequence defined by $u_n = 10n + 2$
List the first four terms of the sequence.

Find the general term

$u_n = u_1 + (n - 1)\,d$

1. Consider the sequence 5, 11, 17, 23, 29, …

(a) Show that the sequence is arithmetic.

(b) Find u_n.

(c) Find u_{20}.

2. Consider the sequence 19, 25, 31, 37, …

(a) Show that the sequence is arithmetic.

(b) Find u_n.

(c) Find u_{12}.

3. In an arithmetic sequence, the third term is 10 and the fifth term is 18.

(a) Find the common difference.

(b) Find u_1.

(c) Find u_n.

4. In an arithmetic sequence, the second term is 29 and the fourth term is 39.

(a) Find the common difference.

(b) Find u_1.

(c) Find u_n.

Paper 1 exercise

1.  An arithmetic sequence has the first term ln a and a common difference ln 3.

The 13^{th} term in the sequence is 8ln 9. Find the value of a.

2.  In an arithmetic sequence, the third term is 10 and the fifth term is 16.

(a) Find the common difference.

(b) Find the value of u_1.

(c) Find the value of S_{20}.

Paper 2 exercise

1. In an arithmetic sequence $u_1 = 7$, $u_{20} = 64$ and $u_n = 3790$.

(a) Find the value of the common difference.

(b) Find the value of n.

2. An arithmetic sequence, $u_1, u_2, u_3, \ldots$, has d = 11 and u_{27} = 263.

(a) Find u_1.

(b)(i) Given that u_n = 516, find the value of n.

(ii) For this value of n, find S_n.

3. In an arithmetic series, $u_1 = -7$ and $S_{20} = 620$.

(a) Find the common difference.

(b) Find the value of u_{78}.