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.

Exercise

1. Tomás is playing with sticks and he forms the first three diagrams of a pattern. These diagrams are shown below.

Diagram 1 Diagram 2 Diagram 3

Tomás continues forming diagrams following this pattern.

(a) Diagram *n* is formed with 52 sticks. Find the value of n.

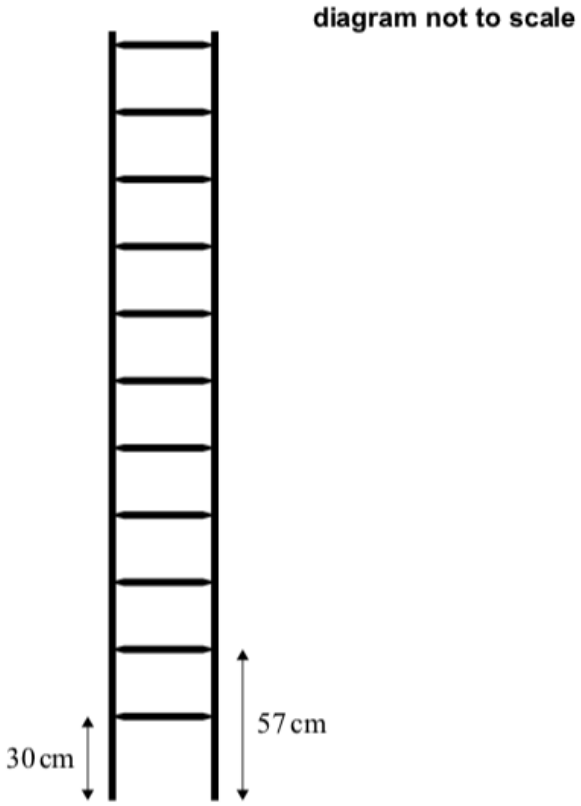
Tomás forms a total of 24 diagrams.

(b) Find the total number of sticks used by Tomás for all 24 diagrams.

2. The company Snakenzen's Ladders makes ladders of different lengths. All the ladders that the company makes have the same design such that:

the first rung is 30 cm from the base of the ladder,
the second rung is 57 cm from the base of the ladder,
the distance between the first and second rung is equal to the distance between all adjacent rungs on the ladder.

The ladder in the diagram was made by this company and has eleven equally spaced rungs.



(a) Find the distance from the base of this ladder to the top rung.
The company also makes a ladder that is 1050 cm long.
(b) Find the maximum number of rungs in this 1050 cm long ladder.

3. A comet orbits the Sun and is seen from Earth every 37 years. The comet was first seen from Earth in the year 1064.

(a) Find the year in which the comet was seen from Earth for the fifth time.

(b) Determine how many times the comet has been seen from Earth up to the year 2014.