1.1 Arithmetic Sequence

A stock boy was stacking cans with in the following sequence. He wanted to stack 10 rows of cans. How many cans will be on the longest row?

Sequence:

A sequence is an ordered list of objects that follow a pattern or rule to determine the next term in the sequence.

The **number of terms** in a sequence is \( n \)

The **first term** of the sequence is \( t_1 \) (term 1).

The **second term** of the sequence is \( t_2 \)

The **general term** for any term in the sequence is \( t_n \)

**Arithmetic Sequence**

An arithmetic sequence follows the rule where there is a constant **common difference** between each consecutive terms.

The common difference is given by:

\[
d = t_2 - t_1 \quad \text{OR} \quad d = t_n - t_{n-1}
\]

**Example 1:**

10, 16, 22, 28,... is a sequence that continues infinitely

\[
t_1 = \\
d = \\
t_n =
\]
The **general term** is given by:

\[ t_n = t_1 + (n - 1)d \]

Where \( t_1 \) is the first term

\( n \) is the number of terms (or left as \( n \))

\( d \) is the common difference

\( t_n \) is the general term OR \( n \)th term of the sequence

**Example 2:**

Determine a general term for the following sequence:

12, 19, 26,...

What is the 7th term in the sequence?

**Try:**

A pizza company sells plain pizzas for $6 and charges $1.50 for each topping. What general term can be used to determine the price of the pizza given \( n \) toppings?

How much does a pizza with 5 toppings cost?

**Example 3:**

In the following sequence, which term has the value of -67?

43, 32, 21,...

**Try:**

At the end of the first month, a colony of ants has a population of 40. The population grows by 80 each month. After how many months will the population be 3000?

**Example 4:**
An arithmetic sequence has the third term of 16, and the 8th term as 6. What is the common difference and the first term? What is the general form?

Try:

You are given a job of stacking cans. The number of cans in the rows produces an arithmetic sequence. There are 14 cans in the 8th row, and 10 cans in the 12th row. Determine $t_1$, $d$ and $t_n$.