## ARITHMETIC SEQUENCES

A sequence is an ordered list of elements called terms. These terms follow a pattern or rule to determine the next term in the sequence.

Each term is labeled according to its position by a subscript.

Example 1: 6, 8, 10, 12, 14, 16, 18, 20 is a sequence.

The pattern could be explained by: “To go from one term to the next, add 2” or “It’s the sequence of even numbers starting at 6 and ending at 20”.

First term: t1= 6

2nd term : t2 = 8 … t7 = 18

We call general term of the sequence, the formula determining the nth term of the sequence.

General term of this sequence: tn = 2n + 4

(If you replace n by and rank in the sequence, you can get the value of the term… t3 = 2 × 3 + 4 = 10)

A sequence can be finite or infinite.

6, 8, 10, …, 20 6, 8, 10, 12, …

An arithmetic sequence is a particular type of sequence. The pattern is that to get the next term, you always add the same number (positive or negative). In other words, the difference between 2 consecutive terms is constant. We call it d: the common difference.

Examples: The sequence from Example 1 is arithmetic.

d = 2

The sequence: 9, 4, -1, -6, -11… is arithmetic.

d = -5

 1, 2, 4, 8, 16, 32, … is not arithmetic.

The pattern is to double each term to get the next one.

t2 - t1 = 1 The difference between

t3 – t2 = 2 … 2 consecutive terms

is not constant!

Rank of the term

Common difference

tn = t1 + (n-1) d

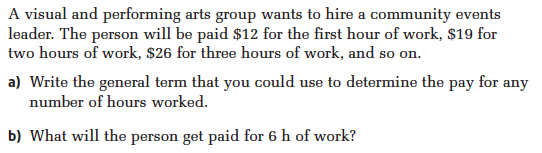
General term for an arithmetic sequence

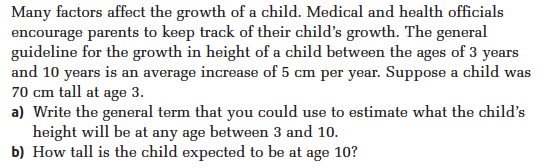
Value of the nth term

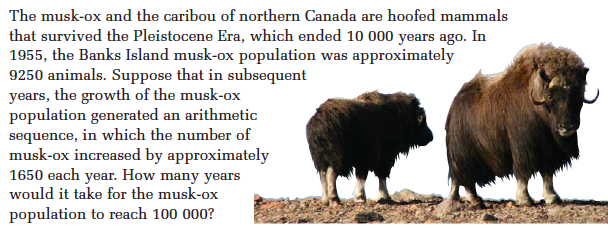
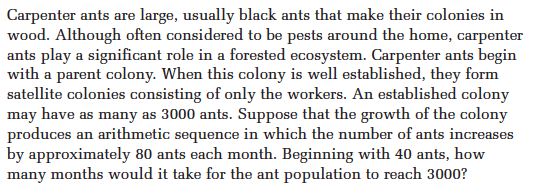
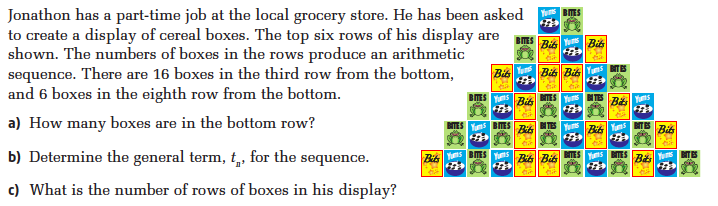
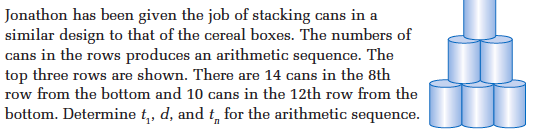
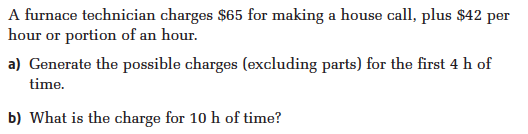
Value of the 1st term

We can also use a similar formula for any 2 terms:

Applications:

1. Determining a particular term:   
   

🡪 Your turn  


1. Determining the number of terms:   
     
     
     
     
     
     
     
     
     
     
     
     
   🡪 Your turn   
   
2. Determining t1, tn, and n:   
     
     
     
     
     
     
     
     
     
     
   🡪 Your turn  
   
3. Generate a sequence:   
     
     
     
     
     
     
     
     
     
   🡪 Your turn  
   

Hwk: worksheet # 1c, 3 – 5, 8 – 11, 13, 16, 17, 22, 24, 26.