

In the following sequence of numbers predict the next three numbers in the pattern:

a) 1, 2, 3, 4, 5, 6, \_\_, \_\_, \_\_

b) 1, 2, 3, 2, 5, 2, \_\_, \_\_, \_\_

c) 1, 2, 4, 7, 11, 16, 22, \_\_, \_\_, \_\_

d) 1, 3, 5, 7, 9, 11, \_\_, \_\_, \_\_

e) 2, -4, 8, -16, 32, -64, \_\_, \_\_, \_\_

f) 5, 9, 13, 17, 21, 25, \_\_, \_\_, \_\_

g) 8, 6, 4, 2, 0, -2, \_\_, \_\_, \_\_

h) 1, 2, 5, 4, 9, 6, \_\_, \_\_, \_\_

i) 256, 128, 64, 32, 16, 8, \_\_, \_\_, \_\_

j) 1, 1, 3, 2, 9, 4, \_\_, \_\_, \_\_

### Definition

A **sequence** is a set of numbers that are listed in a specific order. Each number is called a **term** of that sequence.

### Notation

The notation that is used to select a particular term of a sequence is  $t_n$ , where 'n' refers to the specific term number that is required.

*For example in the sequence: 1, 1, 2, 3, 5, 8, 13, ... we would write that  $t_6 = 8$ , as the sixth term is 8.*

### General Term

In some sequences, there will be a specific formula that is used to create each term. When that happens we use that formula as the **general term** and call it  $t_n$ .

*For example in the sequence: 2, 4, 6, 8, 10, ... the first term is  $2 \times 1$ , the second term is  $2 \times 2$ , the fifth term is  $2 \times 5$ , so that the ' $n^{\text{th}}$ ' term is  $2 \times n$ . We would write that  $t_n = 2n$ .*

### Types of Sequences

Sequences such as 1, 4, 7, 10, 13, ... and 2, 7, 12, 17, 22, ... are formed by adding the same number each time from one term to the next. Sequences such as these are called **arithmetic sequences**.

**Create a general term for the sequence 2, 7, 12, 17, 22, ...**

Sequences such as 2, 6, 18, 54, 162, ... and 1, -2, 4, -8, 16, ... are formed by multiplying by the same number each time from one term to the next. Sequences such as these are called **geometric sequences**.

**Create a general term for the sequence 1, -2, 4, -8, 16, ...**

Sequences such as 1, 1, 2, 3, 5, 8, 13, ... and 1, 3, 2, -1, -3, -2, ... are formed by relating each new term with the term or terms that come before it. Sequences such as these are called **recursive sequences**.

**Create a general term for the sequence 1, 1, 2, 3, 5, 8, 13, ...**