* 1. **Sequences**

1. What are the next six terms in the following pattern: 11, 18, 25, …

2. What is the seventh term in this pattern: 3, 8, 13, …

3. What is the 10th term in this pattern: 4, -6, -16, …

4. Find the 31st term in this pattern (try to find a formula to help you): 2, 7, 12, …

5. a) Find the 1st number if the eighth, ninth and tenth numbers are 16, 19, 22

b) Explain how you found your answer.

6. a) How many terms are there in the following pattern: -3, 2, 7, … , 152

b) Explain how you found your answer.

All of the patterns in questions 1 to 6 are examples of **Arithmetic Sequences**. These are *ordered lists of terms in which the difference between consecutive terms is constant* (doesn’t change).

Arithmetic sequences can be *infinite* or *finite*.

Arithmetic sequences can be *increasing* or *decreasing.*

7. Complete the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Arithmetic**  **Sequence?** | **if yes 🡪** | **Increasing or**  **Decreasing?** | **Infinite or**  **Finite?** |
| 72, 90, 108, 126, … |  |  |  |
| 36, 30, 24, … , 0, -12 |  |  |  |
| 2, 4, 8, 16, 32, … |  |  |  |
| -4, 1, 6, … , 71, 76 |  |  |  |

8. a) Insert two numbers between 17 and 59, so that the four numbers form an arithmetic sequence.

b) Explain how you found your answer.

In an arithmetic sequence: - the first term is denoted by *a*

- the common difference is denoted by *d*

- the number of terms is denoted by *n*

- the nth term (or general term) is denoted by *tn*

9. Consider the following arithmetic sequence: 9, 13, 17, 21, …

1. What is a?
2. What is d?
3. What is t2 in terms of a and d? t2 =
4. What is t3 in terms of a and d? t3 =
5. What is t4 in terms of a and d? t4 =
6. What is tn in terms of aand d? tn =

You just DISCOVERED an equation for the general term (tn) of an arithmetic sequence!!