SEQUENCES. ARITHMETIC PROGRESSIONS

1) Find the general term of the following sequences:

a) $\{2, 5, 8, 12, 15, \cdots\}$ $a_n = 2 + 3(n-1) = 3n - 1$

b) $\{-3, 0, 3, 6, 9, \cdots\}$ $a_n = -3 + 3(n-1) = 3n - 6$

c) $\{1, 2, 4, 8, 16, \cdots\}$ $a_n = 2^{n-1}$

d) $\{0, 1, 4, 9, 16, 25, \cdots\}$ $a_n = (n-1)^2$

2) In the following lists of numbers, find which ones are arithmetic progressions. In that case, indicate the first term, the common difference and the general term:

a) $\{2, 7, 12, 17, 22 \cdots\}$ $a_n = 2 + 5(n-1) = 5n - 3$

b) $\{3, 7, 12, 18, 25 \cdots\}$ NAP

c) $\{4, 0, -4, -8, -12 \cdots\}$ $a_n = 4 - 4(n-1) = 8 - 4n$

d) $\{2, 6, 18, 54, 162 \cdots\}$ GP

e) $\{5, 9, 13, 17, 20 \cdots\}$ $a_n = 5 + 4(n-1) = 4n + 1$

f) $\{-7, -11, -15, -19, -23 \cdots\}$ $a_n = -7 - 4(n-1) = -3 - 4n$

3) Find the 15th term and the general term of the AP $\{16, 11, 6, 1, -4, -9 \cdots\}$

$a_n = 16 - 5(n-1) = 21 - 5n$ $a_{15} = -54$

4) The first term of an AP is -3 and the 12th term is 41. Determine the common difference.

d = 4

5) The common difference of an AP is 5 and the 10th term is 43. Find its first term.

$a_1 = -2$

6) The first term of an AP is -2 and the 11th term is 18. Find its 15ht term.

$a_{15} = 26$

7) The first term of and AP is 4 and the common difference is -3. Find its 12th term

$a_{12} = -29$

8) The first term of and AP is 2 and the 9th term is 26. Find the common difference

d = 3

9) The 12th term of an AP is -28 and the 18th term is -46. Find its first term and the common difference.

$a_1 = 5$ d = -3

10) Which term of the AP $\{5, 2, -1, -4 \cdots\}$ is -22?

$a_{10} = -22$

11) Find the sum of the first 12 terms of the APs

a) $\{11.16, 21, 26, 27, \cdots\}$ $S_{12} = 462$

b) $\{-151, -148, -145, -142, \cdots\}$ $S_{12} = -1614$

12) Find the sum of the first 15 terms of these APs:

a) $\{11, 6, 1, -4, -9, \cdots\}$ $S_{15} = -360$

b) $\{7, 12, 17, 22, 27, \cdots\}$ $S_{15} = 630$

13) How many terms of the AP $\{2, 4, 6, 8, 10, \cdots\}$ are needed to get a sum of 210?

n = 14 $S_{14} = 210$

14) How many terms of the AP $\{25, 28, 31, 34, 35, \cdots\}$ are needed to give a sum of 1070?

n = 20 $S_{20} = 1070$

15) Find the following sum: 2 + 5 + 8 + 11 + ⋯ + 59

S = 610

16) Find the following sum: 1 + 4 + 7 + 10 + ⋯ + 118

S = 2380

17) Find the sum of all natural numbers between 1 and 1000 which are divisible by 3

S = 1689

18) Find the sum of all natural numbers between 1 and 1000 which are divisible by 7

S = 71071

19) The fifth term of an AP is 23 and the 12th term is 57. Find the first term and the common difference.

$a_1 = 15$ d = 2

20) The angles of a triangle are in AP. If the smallest angle is one third the largest angle, find the angles of the triangle.

30º, 60º, 90º

21) The fourth term of an AP is equal to three times its first term, and the seven term exceeds twice the third term by 1. Find the first term and the common difference.

$a_1 = 3$ d = 2

22) Which term of the AP

a) $\{100, 95, 90, 85, \cdots\}$ is -25? n = 26

b) $\left\{\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}, \cdots\right\}$ is $\frac{25}{4}$? n = 25

23) The sum of the first three terms of an AP is 36 and their product is 1620. Find the general term

$a_n = 9 \pm 3(n-1)$