Arithmetic Series

1. Find T_n, the nth term of each of the following sequences:

    i. 2, 5, 8, 11......

    ii. -8, -4, 0 ,4......

    iii. 9, 5, 1, -3....

2. If T_n of an arithmetic sequence is $3n-2$, find the first term and the common difference.

3. The nth term of a sequence is $3n^2 + 2$. Prove that the sequence is not arithmetic.

4. In an arithmetic sequence $T_3 = 7$ and $T_{10} = 21$. Find T_n, the general term..

5. In an arithmetic sequence, $T_2 + T_3 = 11$ and $T_7 + T_9 = 44$. Find T_n, the general term.

6. Find S_n of the series 3+7+11+15......
   How many terms of the series add to 210?

7. In an arithmetic series, $T_4 = 17$ and $S_6 = 87$. Find the values of a and d.

8. A linear series is such that $S_n = 5n + n^2$.

    (a) Find S_1, S_2 and S_3.

    (b) Hence find the first term and the common difference.

    (c) Find T_n, the general term.

9. Three consecutive terms of a linear series are $5 - x, 2x$ and $3x + 2$. Find the value of x.

10. The sum of the first 4 terms of a linear series is 26. If seven times the third term is equal to four times the fifth term, find T_n.

11. $\log_2 x$, $\log_2 y$ and $\log_2 8$ are three consecutive terms of an arithmetic sequence. If $y = 2x$ find x and y.

12. A concert hall is designed in such a way that the number of seats in a particular row is two more than that of the row in front of it. There are 30 seats in the front row.

    i. How many seats are in the fifth row?

    ii. What row has 50 seats in it?

    iii. If there are 4620 seats in total in the concert hall, how many rows of seats are there?

13. An Irish developer is building a new skyscraper hotel in Dubai. The main hotel lobby and plaza will be an open atrium four floors high. Above the lobby there will be additional floors consisting of regular hotel facilities.

It will cost a total of €17m to build the first four floors of the building. The fifth floor will cost €0.5m to build, the sixth floor will cost €0.75m to build. Because of the extra height involved in building extra floors, each additional floor will cost €0.25m more that the floor below it.

   i. What will the 45th floor cost to build?

   ii. If the building is to have 90 floors, what would be the total cost of construction?