1. The *n*th term of a sequence is given by $U_n = n^2 – 2n$. Work out the first 5 terms.

2. Given that the *n*th term of a sequence is $U_n = n^2 – 3n + 2$, find n when $U_n = 110$.

3. A sequence is generated by the formula $U_n = an + b$ where a and b are constants to be found. Given that $U_3 = 8$ and $U_8 = 23$, find the values of a and b.

4. Explain with examples, each of the following phrases and terms
a. recurrence relation
b. arithmetic sequence
c. series

5. Find the first 8 terms of the sequence $U_{n+2} = 3U_{n+1} - 2U_n$, $U_1 = 1$ and $U_2 = -3$

6. Given that $U_{n+2} = bU_{n+1} + U_n$ where b is a constant and $U_1 = 3$ and $U_2 = 8$,
a. find expressions for U_3 and U_4 in terms of b, and
b. if $U_4 = 46$, find the possible values of b.

7. Write the following series as recurrence relations.
a. 4, 7, 10, 13
b. 2, 3, 4, 6, 9, 14
c. 1, -3, 9, -27
d. 3, 8, 63

8. Joel deposits £200 in a savings account and increases the amount by £20 each month thereafter. (a) How much money will he have invested at the 10th month? (b) When will he have £6000 saved?

9. How many terms are there in the arithmetic sequence 4, 9, 14, …, 224, 229?

10. For an arithmetic sequence
a. state the general form for n terms
b. write the equation for the nth term

11. Find the nth term for an arithmetic sequence in which the 4th term is 9 and the 7th term is15.

12. State and prove the proof for the sum of an arithmetic series.

13. Rose puts the £400 she receives for Christmas in a savings account at the start of 2008. At the beginning of 2009 year she adds £50 which she increases by £10 each subsequent year.
a. How much will Rose add in 2014 to her savings account?
b. How much money will Rose have in her account in 2017?
c. In what year will Rose have over £1500 in her account?

14. Find the number of terms required for the sum of 3 + 8 + 13 + 18 + ... to exceed 1000.

15. Find the sum of the numbers that are not multiples of 3 between 100 and 400.

16. The first number in a sequence is 12 and the last is 136. Given that there are 25 terms, find the sum of the sequence

17. Find the sum of the series $(x + 1) + (2x + 1) + (3x + 1) + \ldots + (21x + 1)$

18. Calculate $\sum_{r=1}^{r=10} 5r - 2$

19. Calculate $\sum_{r=8}^{r=20} 3r + 1$