**3A Arithmetic Sequences Introduction**

1. An arithmetic sequence is generated as follows:

6, 20, 34, 48, 72…

1. Find the nth term
2. Find the first term in the sequence that exceeds 200
3. An arithmetic sequence is generated as follows:

101, 94, 87, 80, 73…

1. Find the nth term
2. Find the first term in the sequence that is negative
3. A sequence is generated by the formula , where and are constants to be found.

Given that and , find the values of the constants and .

**3B Arithmetic Series**

Proof:

1. Find the sum of the first 50 terms of the arithmetic series:

…

1. Find the smallest number of terms required for the sum of … to exceed 2000.

**3C Geometric Sequences Introduction**

1. Find the nth and 10th terms of the following sequences…
2. 3, 6, 12, 24…
3. 40, -20, 10, -5…
4. The second term of a Geometric sequence is 4, and the 4th term is 8. Find the values of the common ratio and the first term
5. The numbers 3, x, and (x + 6) form the first three terms of a positive geometric sequence. Calculate the 15th term of the sequence
6. What is the first term to exceed 1 million in the sequence:

…

**3D Geometric Series**

Proof:

1. Find the sum of the following Geometric Series:

… (for 10 terms)

1. Find the sum of the following Geometric Series:

……

1. Find the least value of such that the sum of the following series exceeds 2,000,000:

**3E Geometric Sum to Infinity**

1. For the following series:
2. Find the sum of the first 10 terms
3. Find the sum to infinity
4. The fourth term of a geometric series is 1.08 and the seventh is 0.23328.
5. Show that the series is convergent
6. Calculate the sum to infinity of the series
7. For a geometric series with first term , and common ratio , and .
8. Find the possible values of
9. Given that all terms in the series are positive, find the value of

**3F Sigma Notation**

1. Calculate the following:
2. Find the value of:
3. Find the value of:

**3G Recurrence Relationships**

1. Find the first four terms of the following sequences:

a) ,

b) ,

1. Find the first five terms generated by the following sequence:

,

1. A sequence … is defined by:

where

1. Show that
2. Given that , find the value of
3. Find:

d) Find the value of

**3H Nature of Sequences**

1. For the following relationship, state whether the sequence is increasing, decreasing, or periodic:
2. ,
3. ,

**3I Sequences & Series in Context**

1. Bruce starts a new company. He estimates that in Year 1 his profits will be £20000, and he predicts that his profits will increase by £5000 per year from that point on. He then models that once his annual profits reach £100000, they will then remain constant.
2. Calculate the profit for Bruce’s business in the first 20 years
3. State a reason why this model might not be suitable

Bruce’s financial advisor says that it is more likely that his profits would increase by 5% per year.

1. Using this model instead, calculate the profits that Bruce will make in the first 20 years.
2. A piece of A4 paper is folded in half repeatedly. The thickness of the sheet is 0.5mm.
3. Work out the thickness after 4 folds
4. Work out the thickness after 20 folds
5. State one reason why this might be an unrealistic model