HAWKER COLLEGE
Engage | Inspire | Achieve

**MM2
Arithmetic and Geometric
Sequences and Series**

Goals

By the end of this week, you should be able understand and apply arithmetic sequences and series:

- General Patterns (concepts common to all patterns)
- Notation used in the unit
- Arithmetic Progressions (nth term, sum to nth term, using both graphical and algebraic representations, applications)

Theoretical Components

Resources:
Text book reference: **Maths Quest Further Maths 12 Chapter 5** (See pdf on Google Drive)

Check out the following websites and make notes if needed:
http://www.mathsisfun.com/algebra/sequences-series.html

http://hotmath.com/hotmath_help/topics/arithmetic-sequences.html

Formulas

Sequences and Series

Arithmetic Sequences

nth Term: $a_n = a_1 + (n-1)d$

Sum: $S_n = \dfrac{n}{2}(a_1 + a_n)$ or $S_n = \dfrac{n}{2}\left[2a_1 + (n-1)d\right]$

Geometric Sequences

nth Term: $a_n = a_1 r^{n-1}$

Sum: $S_n = \dfrac{a_1(1-r^n)}{1-r}$ $S_\infty = \dfrac{a_1}{1-r}$

Practical Components

Do the following questions. Organise your solutions neatly in your exercise book.

Ex 5A Recognition of arithmetic sequences
- Q's 9, 10, 12, 14, 15

Ex 5B Finding the terms of an arithmetic sequence
- Q's 1 (a,f), 2 (a,c), 3 (a,b), 4, 7, 9, 18, 20

Ex 5C The sum of a given number of terms of an arithmetic sequence
- Q's 1 (a), 4 (a,d), 6, 14, 17 – 19

Mathspace – no task this week 😊

Investigation

See the following page

QFO
Quiz/Forum/Other

Make sure you submit your assignment by COB Wednesday week 4.

Remember to check-in with your teacher each lesson and get your name marked off.

Maths comp is on this Thursday 5/8, start of L8 in the maths hub.

MM2 INVESTIGATION WEEK 4

The Fibonacci and Lucas Sequences

Leonardo Fibonacci of Pisa was a mathematician in the 12th century, Italy. He discovered a number series from which one can derive the Golden Mean by charting the population of rabbits. Here is the beginning of the sequence:

$$1, 1, 2, 3, 5, 8, 13, 21, 34, \ldots$$

The Lucas numbers or Lucas series are an integer sequence named after the mathematician François Édouard Anatole Lucas (1842-1891). The sequence named after him is closely related to the Fibonacci sequence.

These sequences are defined recursively by:

$$F_1 = 1, F_2 = 1, F_n = F_{n-1} + F_{n-2}, \text{for } n \geq 3$$

$$L_1 = 1, L_2 = 3, L_n = L_{n-1} + L_{n-2}, \text{for } n \geq 3$$

Each number is the sum of the two proceeding numbers.

1. Write out the first 12 terms of each sequence.

2. Explain why every third term of each sequence is even and the rest are odd.

3. Write out the sequence $L_1 + F_1, L_2 + F_2, L_3 + F_3, \ldots$ and $L_1 - F_1, L_2 - F_2, L_3 - F_3, \ldots$

4. How do the two sequences relate to the Fibonacci sequence?