



Mathematics Methods Unit 3 & 4 Investigation 2 2022

Take Home Section

Student name: _____ Teacher name: _____

Task type: Investigation

Take Home out: Friday Week 8, Term 2, 2022

In class Validation: in usual maths rooms 7:40am

Time allowed for in class task: _____ 40 mins

Materials required: Formula Sheet; Calculators and/or Classpads

Standard items:

Pens (blue/black preferred), pencils (including coloured),
sharpened, correction fluid/tape, eraser, ruler,
highlighters

Special items:

Drawing instruments, NO NOTES

Task weighting:

_____ 10% in class only

Formula sheet provided: Yes

Note: All part questions worth more than 2 marks require working to obtain full marks.

INTRODUCTION

The sum of an infinite number of polynomial terms can represent a non-polynomial function. Even though a sum cannot be calculated, an approximation of the function can be obtained by using a finite number of terms. The more terms used, the better the approximation.

TASK:

Investigate the function and the nature of the curve formed by the sum of a finite number of terms of sequences $f(x)$ and $g(x)$ shown below.

$$f(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

$$g(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

Examine $f'(x)$ and $g'(x)$ and any relationship that exists between all functions and graphs considered.