PERTH MODERN SCHOOL
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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), sharpener, 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 through 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.

$$f(x)=x-\frac{x^3}{3!}+\frac{x^5}{5!}-\frac{x^7}{7!}+\ldots \qquad g(x)=1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+\ldots$$

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