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| **FINAL EXAMINATION**  **MARCH 2022 SEMESTER** | | |
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| **SUBJECT CODE** | **:** | **FMM113** |
| **SUBJECT TITLE** | **:** | **MATHEMATICS 2** |
| **LEVEL** | **:** | **FOUNDATION** |

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| **STUDENT’S NAME** | **:** |  |
| **MATRIC NO.** | **:** |  |
| **PROGRAMME** | **:** | **INTERNATIONAL FOUNDATION PROGRAMME** |
| **ACADEMIC FACILITATOR** | **:** | **MS KONG WAI MUN** |
| **LEARNING CENTRE** | **:** | **SCHOOL OF FOUNDATION STUDIES** |

**INSTRUCTIONS TO STUDENTS**

1. This examination consists of **SIX [6]** questions.

2. Candidates are required to answer **ALL** questions.

3. Candidates are strongly advised to manage their time accordingly.

4. This is a **CLOSED BOOK** examination.

5. A calculator may be used when answering questions but all workings must be shown clearly.

6. The use of GRAPHING CALCULATORS is PROHIBITED.

7. State all answers correct to three significant figures, unless otherwise stated or as appropriate.

8. A list of formulae is provided at the end of this paper.

9. Candidates are **NOT** permitted to retain this examination paper.

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| **THERE ARE FOUR [4] PAGES OF , EXCLUDING THIS PAGE.** |

**[TOTAL: 50 MARKS]**

**INSTRUCTION: ANSWER ALL QUESTIONS.**

**Question 1**

Let a curve *C* has an equation .

1. Find the x and y coordinates of the stationary point of C, and whether it is a maximum, a minimum or a point of inflection. (7 Marks)
2. Find the coordinates of the intersections of C with the x-axis. (4 Marks)

Let a line *L* has equation

1. Find the points of intersection of *L* and *C*. (5 Marks)
2. On the same diagram, sketch the graphs of *L* and *C*, indicating the points found in Question (a), (b) and (c). (4 Marks)

**[Total : 20 Marks]**

**Question 2**

1. Differentiate the following:
2. (2.5 Marks)
3. (ii) (2.5 Marks)
4. The second and fourth terms of an arithmetic sequence are 7 and 13.
5. Find the first term and the common difference. (4 Marks)
6. Find an expression for the sum of the first *n* terms. (2 Marks)
7. The sum of the first *k* terms is 50. Find the value of *k.* (4 Marks)

**[Total : 15 Marks]**

**Question 3**

1. Find the annual percentage rate which is equivalent to a rate of 5% compounded monthly. (3 Marks)
2. Find the present value of $6,000 in three years’ time, assuming a constant annual percentage rate of 5%. (3 Marks)
3. Every year, a woman invests $9,000 at a constant annual percentage rate of 4%. Find the total value of the investment immediately after the 20th investment. (6 Marks)
4. A machine is bought for $50,000. After two years it is worth $35,000. Find the annual rate of depreciation, assuming that this is constant. (3 Marks]

**[Total : 15 Marks]**

**SECTION B [TOTAL: 50 MARKS]**

**INSTRUCTION: ANSWER ALL QUESTIONS.**

**Question 1**

1. Differentiate the following:
2. (4 Marks)
3. (ii) (4 Marks)
4. Let a function be defined by
5. Solve the equation when (4 Marks)
6. Sketch the graph of . (3 Marks)
7. Find the area enclosed between the curve and the x-axis (5 Marks)

**[Total : 20 Marks]**

**Question 2**

1. Find (4 Marks)
2. Find the area of the region between the parabola , the *x*-axis and the vertical lines and . (11 Marks)

**[Total : 15 Marks]**

**Question 3**

At the beginning of a year, Mark buys an annuity which will pay $20, 000 at the end of each year. Assume a constant interest rate of 5%, compounded annually.

1. If there are 3 payments, find the present value of the annuity. (5 Marks)
2. The payments continue for *n* years. Find and simplify an expression in *n* for the present value of the annuity. Evaluate this expression for *n* = 16. (7 Marks)
3. If the payments continuity is perpetuity, find the present value of the annuity. (3 Marks)

**[Total : 15 Marks]**

**END OF QUESTION PAPER**

