MTH240 Midterm 1

Practice Paper

Ryerson University Midterm 1 – Winter 2022 MTH 240

RU EMAIL: _____ SIGNATURE_____

Date and Time: February 11, 2022, 6:00 pm (Time allowed: 120 Minutes)

Section (Circle)						
Instructor 1	1	2	3	4		
Instructor 2	5	6	7	8	9	10
Instructor 3	11	12	13	14	15	16
Instructor 4	17	18	19	20	21	22
Instructor 5	23	24	25	26	27	28

Instructions

1. Calculators, notes, and other aids are not allowed.
2. Answer all questions in this booklet. If you need extra room, use 2 pages, clearly indicating where your answer continues. ANYTHING WRITTEN ON THE BACK OF ANY PAGE WILL NOT BE MARKED.
3. In every question, show your work, presented clearly and in the correct order. Unjustified answers will be given little or no credit.
4. Cross out all irrelevant or incorrect work, as marks may be deducted for work, which is misleading, irrelevant, or incorrect.
5. Make sure your test paper is complete; there are 6 questions on 9 pages (including this one). The final 2 pages are given for extra space and do NOT contain questions.

15 marks

1. (a) Why should a future engineer learn about integration techniques and in particular *improper integrals* (word limit 100).

(b) Evaluate

$$\int y^2 \cos(5y)\, dy$$

(c) Evaluate

$$I_1 = \int x\, e^{4x} dx$$

(d) Evaluate

$$I_2 = \int x^2\, e^{4x} dx$$

(d) Evaluate

$$I_n = \int x^n\, e^{4x} dx$$

[Please Upload a PDF or an image of your answers to Q1 to Bitbolide]

15 marks

2. (a) State the product to sum trigonometric identity that may be used to integrate the product of sin and cos of different angles.

(b) Evaluate

$$\int \cos(3\theta)\cos(7\theta)\, d\theta$$

c) Evaluate.

$$\int \sin^6(\theta)\, d\theta$$

[Please Upload a PDF or an image of your answers to Q2 to Bitbolide]

15 marks

3. Evaluate

$$\int \frac{1}{\sqrt{9-25x^2}}dx$$

[Please Upload a PDF or an image of your answer to Q3 to Bitbolide]

15 marks

4. (a) State the partial fraction decomposition form of $f(x) = \frac{7x^2+11x+13}{(3x+4)(x^2+9)}$.

(b) Obtain the constants in the partial fraction decomposition form and hence write $f(x)$ as a sum of partial fractions.

(c) Using your answer in (b) show that

$$\int_0^3 f(x)dx = \frac{1}{3}\ln 26 + \frac{\pi}{12}.$$

[Please upload a PDF or an image of your answers to Q4 to Bitbolide]

15 marks

5. Evaluate the following integral, clearly stating a valid argument in support of your approach to the evaluation.

$$\int_0^\infty xe^{-7x}\,dx$$

[Please Upload a PDF or an image of your answer to Q5 to Bitbolide]