UNIVERSITY OF MANITOBA

DATE: Wednesday, December 10th, 2014 **FINAL EXAM**
TITLE PAGE
DEPARTMENT & COURSE NO: MATH 1700-D01 **TIME:** 2 hours
EXAMINATION: Calculus II **EXAMINER:** M. Virgilio

SURNAME: (Print) _____

GIVEN NAME(S):_____

STUDENT NUMBER: _____

SIGNATURE: _____

(I understand that cheating is a serious offense)

INSTRUCTIONS TO STUDENTS:

This is a 2 hour exam. **Please show your work clearly.**

No texts, notes, or other aids are permitted. There are no calculators, cells phones or electronic translators permitted.

This exam has a title page, 11 pages of questions and also 1 blank page for rough work. Please check that you have all the pages. You may remove the blank page if you want, but be careful not to loosen the staple.

The value of each question is indicated to the right of the question. The total value of all questions is 100 points.

Answer all questions on the exam paper in the space provided beneath the question. If you need more room, you may continue your work on the reverse side of the page, but CLEARLY INDICATE that your work is continued.

Questions	Points	Score
1	8	
2	8	
3	50	
4	7	
5	12	
6	15	
Total:	100	

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PAGE 1 OF 11
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1.
Evaluate $\lim_{x \to 0^+} (1 + 3x)^{\csc x}$ **8 Marks**

2.

Determine whether the improper integral $\int_{-\infty}^{0} \frac{dx}{(x-8)^{2/3}}$ converges or diverges. If it converges, find its value. **8 Marks**

3.
Solve the following integrals:

(a) $\int_0^4 x^3(x^2+1)^{-1/2}\,dx$ **8 Marks**

(b) $\int x^2 e^{3x}\, dx$ **10 Marks**

(c) $\int \sin^5 x \cos^3 x \, dx$ **8 Marks**

(d) $\displaystyle\int \frac{1}{x^3\sqrt{x^2-25}}\,dx.$ **12 Marks**

(e) $\displaystyle\int \frac{2x^2 - 25x - 33}{(x+1)^2(x-5)}\,dx.$ **12 Marks**

4.
Find the length of the curve defined by $(y+1)^2 = (x-4)^3$ between the points $(5, 0)$ and $(8, 7)$. **7 Marks**

5.
For each of the following region, give a rough sketch of the region described, and set up a definite integral (or combination of definite integrals) to find the area of the region. **DO NOT SOLVE THE DEFINITE INTEGRALS.**

(a) The region between the curves $y = x + 6$, $y = x^3$, and $2y + x = 0$.

6 Marks

(b) The region (described in polar coordinates) inside the cardioid $r = 1 + \cos\theta$ and outside the circle $r = 3\cos\theta$. **6 Marks**

6.
Set up **BUT DO NOT SOLVE** the integrals which give the volume of solid obtained by rotating the region bounded by $y = 4 - x$, $x = 0$, and $y = 0$ with $0 \leq x \leq 4$:

(a) about the x-axis. **5 Marks**

(b) about the y-axis. **5 Marks**

(c) about the line $y = -1$. **5 Marks**

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THIS PAGE IS INTENTIONALLY LEFT BLANK FOR ROUGH WORK