THE UNIVERSITY OF MANITOBA

February 4, 2005 5:30 pm - 6:30 pm

TEST 1
TITLE PAGE

DEPARTMENT & COURSE NO: <u>136.170</u>

TIME: <u>1 HOUR</u>

EXAMINATION: <u>Calculus II</u>

EXAMINER: <u>(Identified Below)</u>

NAME: (PRINT) _____

STUDENT NUMBER (IN INK): _____

SIGNATURE (IN INK):   _____
<div align="center">(I understand that cheating is a serious offense)</div>

IMPORTANT:
**Please indicate your instructor and section by placing
a check mark in the appropriate box below.**

SECTION		TIME	INSTRUCTOR
☐ L03	M,W,F	9:30 - 10:20	R. G. Woods
☐ L04	M,W,F	11:30 - 12:20	E. Samei
☐ L05	Tues, Thurs.	1:00 - 2:15	N. Harland
☐ L91	Challenge for Credit		

INSTRUCTIONS TO STUDENTS:
*This is a 1 hour exam. Please show your work **clearly**.*

No calculators, texts, notes or other aids are permitted.

*This exam has a title page, 5 pages of questions and 2
blank pages for rough work. Please check that you have all
the pages. You may remove the blank pages if you want,
but be careful not to loosen the staples.*

*The value of each question is indicated in the left-hand
margin beside the statement of the question. The total
value of all questions is 40.*

*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.*

[4] 1. Use L'Hôpital's rule to evaluate

a. $\displaystyle \lim_{x \to 0}\left(\frac{\ln(1+x)}{1-e^{2x}}\right)$

[5] b. $\displaystyle \lim_{x \to \infty} x^{\frac{1}{\sqrt{x}}}$

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2.

[3]   a.   For curve with parametric equations
$x = 2t - 1, y = 4t^2 - 4t$ with $1 \leq t \leq 4$, find the equation of the tangent line to the curve at $t = 2$.

[4]   b.   For the curve
$$x = \frac{t^3}{3} - 2t^2 + 3t - 7, y = t^2 - 4t; -\infty < t < \infty,$$
find all values of t such that the curve has a vertical or horizontal tangent line.

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3.

[5]   a.   Sketch the curve $r = 2 - \cos\Theta$.

[2]   b.   A curve has equation $r^3 \sin\Theta = 2$. Write its equation in Cartesian coordinates.

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[6]   4.   Evaluate $\lim\limits_{n\to\infty}\sum\limits_{i=1}^{n}\dfrac{1}{n}\left(\dfrac{i^2}{n^2}\right)$ by converting to a definite integral from 0 to 1

and evaluating.

[3]   5.   Find $\dfrac{d}{dx}\left(\displaystyle\int_{1}^{x^2}\dfrac{1}{t^3+3}\,dt\right)$ at $x=3$.

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[5]   6.   Evaluate the definite integral if it exists. If it doesn't exist, explain why
              not.

        a. $\int_{\frac{\pi}{2}}^{\pi} \cos x\, dx$

        b. $\int_{-2}^{1} \frac{1}{x^2}\, dx$

[3]   7.   Find $\int (x-1)^2 dx$