University of Toronto
Faculty of Engineering

MAT 187H1S TERM TEST
WEDNESDAY, MARCH 6, 2002, 5:10 PM
Duration: 50 minutes

Aids Allowed: Casio 260, Sharp 520 or Texas Instrument 30 calculator.

Instructions: Fill in the information on this page, and make sure this test contains 4 pages. Present your **solutions** in the space provided. Use the back of the preceding page if you need more space. The value for each question is indicated in square brackets beside each question number.

TOTAL MARKS: 40

NAME: _____

STUDENT NUMBER: _____

SIGNATURE: _____

TUTORIAL: (eg Tut0102) _____

TUTOR: _____

MARKER'S REPORT:

QUESTIONS	MARKS
Question 1	
Question 2	
Question 3	
TOTAL	

1. [13 marks] Find $\int \frac{6x-2}{x^4-1}\,dx$

2. [12 marks] Plot the two curves with polar equations

$$r = 2 + \cos\theta \text{ and } r = 5\cos\theta$$

and find the area outside $r = 2 + \cos\theta$ but inside $r = 5\cos\theta$.

3. [15 marks] Find the following:

(a) [8 marks] $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at the point $(x, y) = (0, 0)$ if

$$x = t^2 - t \text{ and } y = t^3 + 2t.$$

(b) [7 marks] $\dfrac{d\mathbf{u}}{dt} \times \mathbf{v} + \displaystyle\int \mathbf{v}\, dt$, if $\mathbf{u} = 3t\,\mathbf{i} + \ln t\,\mathbf{j} + 2\,\mathbf{k}$ and $\mathbf{v} = \sin t\,\mathbf{i} + \cos t\,\mathbf{j} + e^t\,\mathbf{k}$.