Practice Midterm
MAT-16B Short Calculus - II

Spring 2011

Name _____

- **This test is closed notes, closed book.**
- **Laptops and calcultors are NOT allowed.**
- **There are 8 pages and 5 questions total.**
- **You can leave an answer as a numerical expression without computing the final value. For example, this is a perfectly acceptable answer :**

  $((250 - 63)/(1 - e^{(-6*3.5)})) * ln(27/168)$. **Show your work clearly !!**
- **The maximum score in the test is 80 points.**

Signature _____

Problem	Score	Max Possible
1		40
2		15
3		10
4		10
5		10
6		15
Total		100

1. Compute the following integrals (note that some of them are indefinite integrals and some are definite integrals).

(a) **(3 pts)** $\int (2x+5)e^{(x^2+5x-1)}dx.$

(b) **(4 pts)** $\int_0^1 x(1-x)^{10}dx.$

(c) **(4 pts)** $\int sec^5(x)tan(x)dx.$

(d) **(4 pts)** $\int \frac{x^4-3}{x^2-1}dx.$

(e) **(6 pts)** $\int \ln(x)dx$.

(f) **(6 pts)** $\int x^2 sin(x)dx$.

(g) **(6 pts)** $\int sec^4(x)dx$. (Hint : $1 + tan^2(x) = sec^2(x)$)

(h) **(2 pts)** Suppose $\int_0^1 sin(x^2)dx = C$. What is $\int_{-1}^0 sin(x^2)dx$ in terms of C ?

(i) **(5 pts)** $\int e^{2x}\sqrt{1+e^x}dx$.

2. **(15 pts)** Find the area of the region bounded by the graphs of $y = |x|$ and $y = x^2$.

3. **(10 pts)** Consider the region bounded by the curves $y = x^3 - 3x^2 + 3x$ and $y = x^2$. Set up (but DO NOT EVALUATE) the integral(s) to compute the area of this region.

4. **(10 pts)** The temperature of an ice cream sandwich as a function of time t ($t = 0$ being when it is removed from the freezer) is given by

$$T(t) = \frac{60t}{1 + 4t^2}$$

for $0 \leq t \leq 1/2$. What is the average temperature over this time period?

5. **(10 pts)** Consider the region bounded by the graphs $y = e^x$, $y = 1 - x$, $x = 0$ and $x = 1$. Set up (but DO NOT EVALUATE) the integral to compute the volume of the solid obtained by revolving this region around the x-axis.

6. **(15 pts)** Consider the region bounded by the graphs of $y = x$, $y = (x-2)^2$, and $y = 0$. Set up (but DO NOT EVALUATE) the integral(s) to compute the volume of the solid obtained by revolving this region about the x axis.