

## Exam 2

Name:

Section Time (circle):

7:45 (Medini)    8:50 (Beros)    8:50 (Georgiou)    9:55 (Georgiou)    9:55 (Medini)  
11:00 (Kumar)    12:05 (Kumar)    1:20 (Lien)    2:25 (Lien)    3:30 (Beros)

**You must explain all your work to receive credit for your answers**

**No calculators are permitted (or necessary) on this exam.**

**These problems are not arranged in ascending order of difficulty. Work them in an order that will maximize your score. If you need more space, use the back of the page. *Good luck!***

Problem	Score	Problem	Score
1		5	
2		6	
3			
4		Total	

1. Compute the following integrals:

(a) [10 points]  $\int x e^{x^2} dx$

(b) [10 points]  $\int_0^1 \frac{x^2}{x+3} dx$

(c) [10 points]  $\int_1^e \left( \frac{\ln x}{x} + \ln x \right) dx$

2. [20 points] You want to build a box with a square base and top, and you want the area of all the sides of the box to total 600 square inches. What is the maximum possible volume?

3. [15 points] Find the global maximum and minimum of the function  $f(x) = 2x^3 - 3x^2 - 12x - 2$  on the interval  $[-3, 3]$ .

4. [15 points] Suppose that a car starts at rest and begins moving along a straight road with a velocity of  $\frac{70t^3}{t^2 + 10}$  miles per hour, where  $t$  is measured in seconds. Find the car's average speed over the first two seconds. Simplify any natural logs in your answer into a single natural log.

5. [20 points] Find the area between the curves given by  $f(x) = -x$  and  $g(x) = xe^x$  on the interval  $[-1, 2]$ .