

Math 1131  
Autumn 2012  
Midterm 3  
Form A

Name: \_\_\_\_\_

Name.nn: \_\_\_\_\_

Lecturer: \_\_\_\_\_

Rec. Instructor: \_\_\_\_\_

Rec. Time: \_\_\_\_\_

**Instructions:**

- You have **55 minutes** to complete this exam. It consists of 7 problems on 8 pages including this cover sheet and is worth a total of 100 points. The value of each question is listed below and with each question.
- You may not use any books or notes during this exam.
- Calculators are permitted EXCEPT those calculators that have symbolic algebra or calculus capabilities. In particular, the following calculators and their upgrades are not permitted: TI-89, TI-92, and HP-49. In addition, neither PDAs, laptops nor cell phones are permitted.
- Make sure to read each question carefully.
- Please **write clearly** and make sure to **justify your answers**. Correct answers with no supporting work may receive no credit. Unless otherwise stated, solutions found by graphing will receive no credit.
- Please write your answers on the indicated lines.
- A random sample of graded exams will be xeroxed before being returned.

Problem	Point Value	Score
1	16	
2	18	
3	10	
4	16	
5	14	
6	10	
7	16	
Total	100	

(1). (16 points) A car rental company can lease 3200 cars for \$18 each per day. A market survey shows that the company could lease 160 additional cars for each \$0.50 reduction in the daily rate. What is daily rate that the company should charge to maximize its daily revenue? What is the maximal daily revenue?

Answer (1): Daily rate = \_\_\_\_\_

Maximal daily revenue = \_\_\_\_\_

(2). Find the indefinite integrals. You DO NOT need to simplify your answers.

(a) (6 points)  $\int \frac{7}{(5x - 4)^3} dx$

Answer (2a): \_\_\_\_\_

(b) (6 points)  $\int x^9 e^{x^{10}} dx$

Answer (2b): \_\_\_\_\_

(Problem (2) cont.)

(c) (6 points)  $\int \frac{5y^4}{y^5 - 11} dy$

Answer (2c): \_\_\_\_\_

(3). (10 points) Suppose that

$$\frac{dr}{dq} = 224 - 6q - 0.9q^2$$

is a marginal-revenue function. Find the demand function.

Answer (3): \_\_\_\_\_

- (4). (16 points) Sketch the region in the first quadrant that is bounded by the given curves. Approximate the area of the region by using five rectangles of identical width (ie. find the sum  $S_5$ ). Use the right-hand endpoint of each subinterval.

$$f(x) = x^2 + 5, \quad y = 0, \quad x = 3, \quad x = 8$$

Answer (4):  $S_5 =$  \_\_\_\_\_

(5). Evaluate the definite integral.

(a) (7 points)  $\int_1^4 5t^{-4} dt$

Answer (5a): \_\_\_\_\_

(b) (7 points)  $\int_{-27}^{27} \sqrt[3]{x^2} dx$

Answer (5b): \_\_\_\_\_

(6). (10 points) A manufacturer's marginal-cost function is

$$\frac{dc}{dq} = 0.6q + 13$$

If  $c$  is in dollars, determine the cost involved to increase production from 75 to 85 units.

Answer (6): Change in cost = \_\_\_\_\_

- (7). (16 points) Set-up, but DO NOT EVALUATE, an integral to find the area of the region bounded by the given curves. Be sure to find any needed points of intersection.

$$y = 4x^2 - 4, \quad y = -2x^2 + 2$$

Answer (7): \_\_\_\_\_