Math 1131
Autumn 2015
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 questions 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. Partial credit might not be awarded on some questions.
- 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.
- Unless otherwise specified, make sure your answers are in **exact form** (i.e. not decimal approximations).
- 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	15	
2	21	
3	10	
4	13	
5	18	
6	9	
7	14	
Total	100	

(1). (15 points) A retailer currently sells 32 notebook computers per day at a price of \$480. Market research indicates that for each \$6 reduction in price, 8 more notebook computers per day would be sold.

(**a**) (13 points) How much should the retailer charge in order to maximize their daily revenue?

Answer (1a): Revenue maximizing price: _____

(**b**) (2 points) What is the maximum daily revenue?

Answer (1b): Maximum daily revenue: _____

(2). (21 points) Find the indefinite integrals. You DO NOT need to simplify your answers.

(**a**) (7 points) $\displaystyle\int \frac{\ln x}{5x}\, dx$

Answer (2a): _____

(**b**) (7 points) $\displaystyle\int 5^{7x}\, dx$

Answer (2b): _____

(Problem (2) cont.)

(c) (7 points) $\displaystyle\int \frac{y^5+3}{y^6+18y+1}\,dy$

Answer (2c): _____

(3). (10 points) Suppose that

$$\frac{dr}{dq} = 0.12q^2 - 1.8q + 6.5$$

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

Answer (3): _____

(4). (13 points) Given the region in the first quadrant that is bounded by the given curves:

$$f(x) = x^2 + 3, \quad y = 0, \quad x = 4, \quad x = 12$$

(**a**) (10 points) Approximate the area of the region by using four rectangles of identical width (ie. find the sum S_4). Use the right-hand endpoint of each subinterval.

Answer (4a): $S_4 =$ _____

(**b**) (3 points) Write down, but DO NOT EVALUATE, an integral which gives the EXACT area of this region.

Answer (4b): Area = _____

(5). (18 points) Evaluate the definite integral. Please give the EXACT value of each integral.

(**a**) (9 points) $\int_1^6 3\sqrt{67-3t}\,dt$

Answer (5a): _____

(**b**) (9 points) $\int_1^2 6x^{-5}\,dx$

Answer (5b): _____

(6). (9 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.

$$y = x^2 - 5x - 3, \quad y = 7 - 2x$$

Answer (6): _____

(7). (14 points) The demand equation for a product is

$$p = 19.8 - 0.6q$$

and the supply equation is

$$p = 3.8 + 1.4q$$

(**a**) (3 points) Find the equilibrium point (q_0, p_0).

Answer (7a): $q_0 =$ _____

$p_0 =$ _____

(**b**) (11 points) Determine the consumers' surplus under market equilibrium.

Answer (7b): Consumers' surplus: _____