

Math 148
Exam 2
July 29, 2010

Name: _____

1. Your exam contains 5 questions and 5 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values vary and these are indicated on each problem. You have 1 hour for this exam.
3. Make sure to ALWAYS SHOW YOUR WORK; you will not receive any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. Put a box around your final answer where applicable.
5. Leave answers in exact form (as simplified as possible) or round to 4 decimal places.
6. You are allowed one 3" × 5" notecard for handwritten notes (both sides).
7. You may use a calculator for this exam, but I will not give credit for work done solely on a calculator (aside from arithmetic).
8. If you need extra space, use the back of the exam and clearly indicate this.

Problem	Total Points	Score
1	40	
2	21	
3	20	
4	9	
5	10	
Total	100	

1. (40 pts.) Evaluate the following. You do **not** need to simplify your answers.

(a) (8 pts.) $\frac{d}{dx}[\sqrt{4x^2 + x} + \frac{1}{x} + x] =$

(b) (8 pts.) $\frac{d}{dt}[7e^{5t} \cdot t^{11}] =$

(c) (8 pts.) $\frac{d}{ds}\left[\frac{3s^2}{\ln(s)+4}\right] =$

(d) (8 pts.) $\int \frac{3}{x^5} + 9e^{3x} + 1 \, dx =$

(e) (8 pts.) $\int 6t^2(t^3 + 2)^3 \, dt =$

2. (21 pts.) Consider $g(t) = 20 \ln(t) + t^2 - 14t$ for parts (a) and (b) below.

(a) (14 pts.) Find the critical numbers of $g(t)$. Identify each critical number as a local maximum, local minimum, or neither by using either the first **or** second derivative test.

(b) (7 pts.) If the domain is restricted to $1 \leq t \leq 4$, what are the global maximum and global minimum **values** of $g(t)$ on this domain?

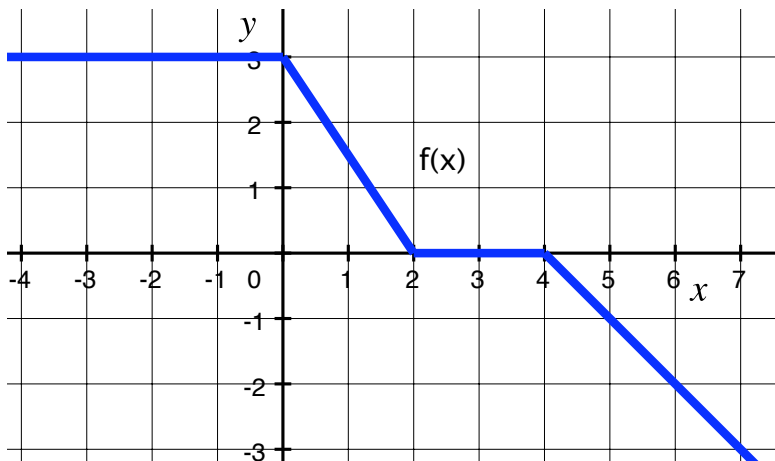
3. (20 pts.) Suppose you sell trinkets for \$24 each. The following tables give the marginal cost and average cost for producing certain quantities of trinkets.

quantity q	300	400	500	600	700	800	900	1000	1100	1200
$MC(q)$	30	24	20	19	18	21	27	35	40	45

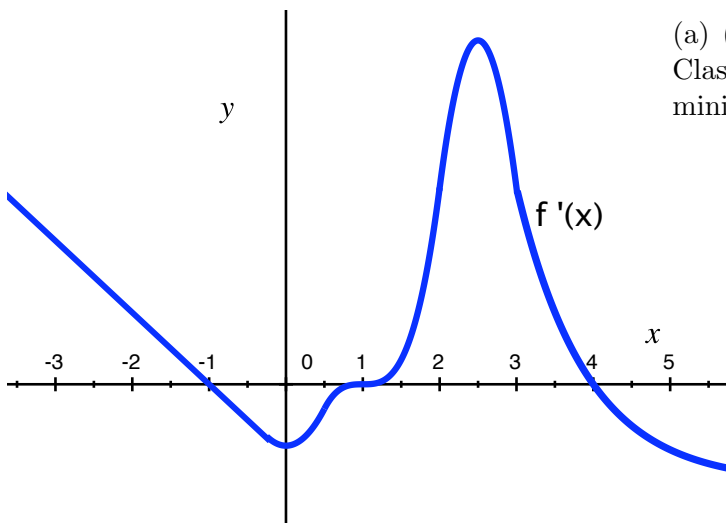
quantity q	300	400	500	600	700	800	900	1000	1100	1200
$AC(q)$	26	25	24	23	21	20	22	23	25	27

- (a) (5 pts.) To increase profit, should you increase or decrease production at the production level of $q = 600$? Briefly explain.
- (b) (5 pts.) Estimate the production level that maximizes profit.
- (c) (5 pts.) Find the total cost of producing 600 items.
- (d) (5 pts.) Find the profit of producing and selling 600 items.

4. (9 pts.) A graph of $f(x)$ is given below. Find the exact value of $\int_{-2}^6 f(x) dx$.



5. (10 pts.) Below is a graph of the **derivative** function $f'(x)$ for an unknown function $f(x)$. Use the graph to answer the following questions about $f(x)$.



- (a) (6 pts.) Give the critical numbers of $f(x)$. Classify each as a location of a local maximum, minimum, or neither.

- (b) (4 pts.) Give the x -coordinates of the inflection points of $f(x)$.