

NAME: \_\_\_\_\_

Student ID #: \_\_\_\_\_

QUIZ SECTION: \_\_\_\_\_

**Math 111**  
**Midterm II**  
February 16, 2006

Problem 1	17	
Problem 2	20	
Problem 3	13	
<b>Total:</b>	<b>50</b>	

- You may use a calculator, a ruler, and one sheet of notes.
- Your exam should contain 5 pages in total and 3 problems. Please check your test for completeness.
- You **must show entirely how you get your answers**. Work done “in your head” cannot get credit. Correct answers with incomplete, wrong or missing work will result in little or no credit.
- Write your **final answer in the indicated units and in the indicated spaces**.
- If you need more room, use the backs of pages and indicate to the reader that you have done so. If you still need more paper, ask your TA for some more, write your name and section on it and make sure you turn it in to your TA inside your test.
- Read each question carefully. Raise your hand if you have a question.

GOOD LUCK!

---

*Do you want me to post your grade so far next week on the class website under the last 4 digits of your SN?*

*Yes, please post my grade. Sign to give permission: \_\_\_\_\_*

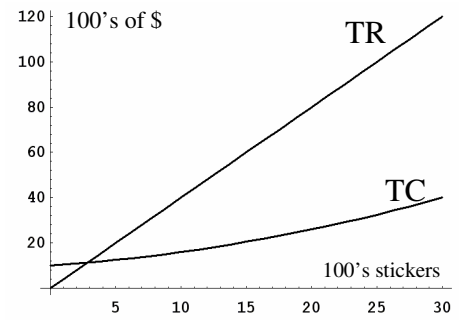
*No, please don't post my grade so far.*

1 (17 points) You own a business manufacturing and selling Bumper Stickers. Your total cost and total revenue, in hundreds of dollars, for a batch of  $q$  hundred Stickers are given by the following formulas:

$$TR(q) = 4q$$

$$TC(q) = 0.02q^2 + 0.4q + 10$$

- a) What is the largest number of Stickers you can produce so your total cost does not exceed \$1200?



Answer: No more than \_\_\_\_\_ Stickers.

- b) What is the maximum profit you can make? For what quantity do you get this maximal profit?

Answer: Maximum profit is \_\_\_\_\_ dollars and it is obtained for \_\_\_\_\_ Stickers.

- c) What is the least number of Stickers that you must produce and sell in order to break even (make zero profit)?

Answer: \_\_\_\_\_ Stickers.  
 ( round off your answer to the nearest whole number)

2 (20 points=4 each part)

You open a food stand at the HUB, selling Husky Cookies. To increase your sales, this week you run a promotion: you charge \$3 for orders of a single cookie, but for each extra cookie purchased by a customer you reduce the price per cookie by \$0.20. For example, a person ordering 3 cookies pays just \$2.60 per cookie.

Your average cost for making and selling  $q$  cookies is  $AC(q) = 0.5 + \frac{3}{q}$  dollars.

- a) What is your total revenue for an order of 7 cookies?

Answer:  $TR(7) =$  \_\_\_\_\_ dollars.

- b) Find a formula for the selling price per cookie, as a function of the quantity  $q$  ordered.

Answer: The price per cookie is  $p(q) =$  \_\_\_\_\_.

- c) For what order size do you get an Average Revenue of \$1.60?

Answer: For an order size of \_\_\_\_\_ cookies.

The following questions continue the previous cookie problem. Recall that your average cost for making and selling  $q$  cookies is

$$AC(q) = 0.5 + \frac{3}{q} \text{ dollars.}$$

d) What is your total cost for producing 7 cookies?

Answer:  $TC(7) =$  \_\_\_\_\_ dollars

e) What is the smallest order size to make a profit of at least \$5?

Answer: To make a profit of \$5 or more, you must produce and sell at least \_\_\_\_\_ cookies.

*Note: Your answer should be a whole number of cookies, since you cannot produce or sell part of a cookie.*

3(13 points: 4+5+4) Two cars (A and B) travel down a road for two hours.

During this two hour trip, the **distance** that car A travels from its initial position is given by

$$D_A(t) = 10t^2 + 30t,$$

where the time  $t$  is measured in hours, and the distance  $D_A$  is measured in miles.

- a) When will car A's **average trip speed** be 45 miles per hour?

Answer: After \_\_\_\_\_ hours

- b) Find a formula (in terms of  $t$ ) for car A's **average speed from** some time  $t$  **until 30 minutes** later. (Note that the time is measured in hours!) Simplify your formula as much as possible.

Answer:  $AS(t) =$  \_\_\_\_\_.

- c) The second car, car B, travels with (instantaneous) **speed**  $S_B(t) = 20t + 30$ , where the time  $t$  is still measured in hours, and the speed  $S_B$  in miles per hour. How far did car B travel during the first half hour?

Answer: Car B travels \_\_\_\_\_ miles in the first half hour.