

Math 111 B - Autumn 2011
Mid-Term Exam Number Two
November 17, 2011

Name: _____

Section: _____

HONOR STATEMENT

"I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam."

Signature: _____

1	20	
2	25	
3	20	
Total	65	

- Complete all questions.
- You may use a calculator during this examination. Other electronic devices are not allowed.
- Turn your cell phone off and put it away for the duration of the exam.
- You may use one, hand-written, double-sided, 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.
- Put your name on your sheet of notes and turn it in with the exam.

GOOD LUCK!!

1. You manufacture and sell Objects. Your total cost, TC , is a linear function of quantity, q . If you make 100 Objects, your cost is \$1400. If you make 250 Objects, your cost is \$1820. You sell Objects for \$35.

(a) Find a formula for total cost, TC , as a function of q .

(b) At what quantity, q , do you break even?

(c) What is your marginal cost?

(d) At what quantity is average cost, AC , equal to \$11?

2. You make and sell Things. For a quantity of q Things, your total cost is

$$TC(q) = 0.1q^2 + 2q + 8000.$$

You sell Things for \$170.

(a) At what quantities do you break even?

(b) At what quantity do you have the greatest profit?

(c) What is your maximum possible profit?

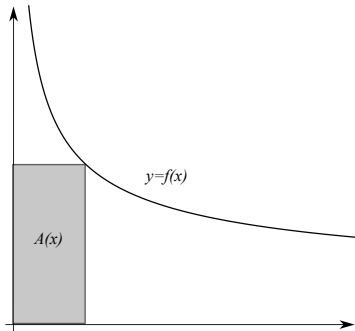
(d) Give a formula for marginal cost, MC .

(e) At what quantity q is marginal cost equal to \$40?

3. The figure below shows the graph of the function

$$f(x) = \frac{10}{\sqrt{x}} + 1.$$

We can create a rectangle with one corner at the origin and sides along the x - and y -axes, with one corner at $(x, f(x))$. One such rectangle is shown.



- (a) Find the area of the rectangle if the width is $x = 5$.
- (b) Find the area of the rectangle given by the point on the graph where $f(x) = 7$.
- (c) Give the general formula for the area $A(x)$ of the rectangle as a function of its width, x .
- (d) Find a value of x , with $x < 10$, for which $A(x) = 22$.