

MATH 111
Exam II
November 15, 2007

Name _____

Student ID # _____

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	18	
2	16	
3	16	
Total	50	

- Please check that your exam contains 3 problems.
- Please turn your cell phone OFF and put it away for the duration of the exam.
- Unless otherwise indicated, you must show your work. The correct answer with no supporting work may result in no credit.
- If you use a guess-and-check method when an algebraic method is available, you may not receive full credit.
- Put your name on your sheet of notes and turn it in with the exam.

GOOD LUCK!

1. (18 points) You sell Quipples on a sliding price scale. The price p per Quipple on an order of q **thousand** Quipples is

$$p = 20.10 - 0.1q \text{ dollars.}$$

- (a) Write out a formula for your total revenue (in thousands of dollars) for selling q thousand Quipples.

ANSWER: $TR(q) =$ _____

- (b) Name the longest interval over which TR is increasing.

ANSWER: from $q =$ _____ to $q =$ _____ thousand Quipples

- (c) The Quipples cost \$2 each to produce and you have fixed costs of five thousand dollars. Write out a formula for the total cost (in thousands of dollars) to produce q thousand Quipples.

ANSWER: $TC(q) =$ _____

- (d) On the interval from $q = 1$ to $q = 6$ thousand Quipples, what is the largest value of total cost?

ANSWER: _____ thousand dollars

- (e) What quantity maximizes profit?

ANSWER: _____ thousand Quipples

2. (16 points) You sell *Items*. Your marginal revenue and marginal cost are given by the formulas:

$$MR(q) = 2.539 - 0.4q \quad MC(q) = 0.1q^2 - 0.8q + 1.85,$$

where q is measured in **hundreds** of Items and marginal revenue and marginal cost are in dollars per Item.

- (a) Find the quantity that maximizes profit.

ANSWER: $q =$ _____ hundred Items

- (b) Find the quantity at which MR exceeds MC by exactly \$0.50 per Item.

ANSWER: $q =$ _____ hundred Items

- (c) At what quantity is MC lowest?

ANSWER: $q =$ _____ hundred Items

- (d) The formula for average variable cost is:

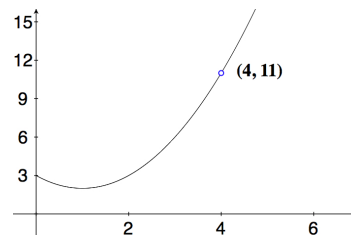
$$AVC(q) = \frac{1}{30}q^2 - \frac{2}{5}q + 1.85,$$

where q is in hundreds of Items and AVC is in dollars per Item. Find the shutdown price.

ANSWER: \$ _____ per Item

3. (16 points) The parabola at right has a formula that looks like

$$f(x) = ax^2 - 2x + c.$$



- (a) Use the fact that $f(0) = 3$ and $f(4) = 11$ to find the values of a and c .

ANSWER: $a =$ _____, $c =$ _____

Use your answers to part (a) to complete the formula for $f(x)$ and use this completed formula to answer the remaining questions:

$$f(x) = (\quad)x^2 - 2x + (\quad).$$

- b) Find the slope of the diagonal line through $f(x)$ at $x = 2$.

ANSWER: _____

- c) Write out a formula for $\frac{f(1+h) - f(1)}{h}$. Simplify your formula as much as possible.

ANSWER: $\frac{f(1+h) - f(1)}{h} =$ _____

- d) Find a value of x such that $\frac{f(x) - f(0)}{x} = \frac{10}{3}$.

ANSWER: $x =$ _____