

Math 111 - Winter 2004
Mid-Term Exam Number One
February 3, 2004

Name: _____

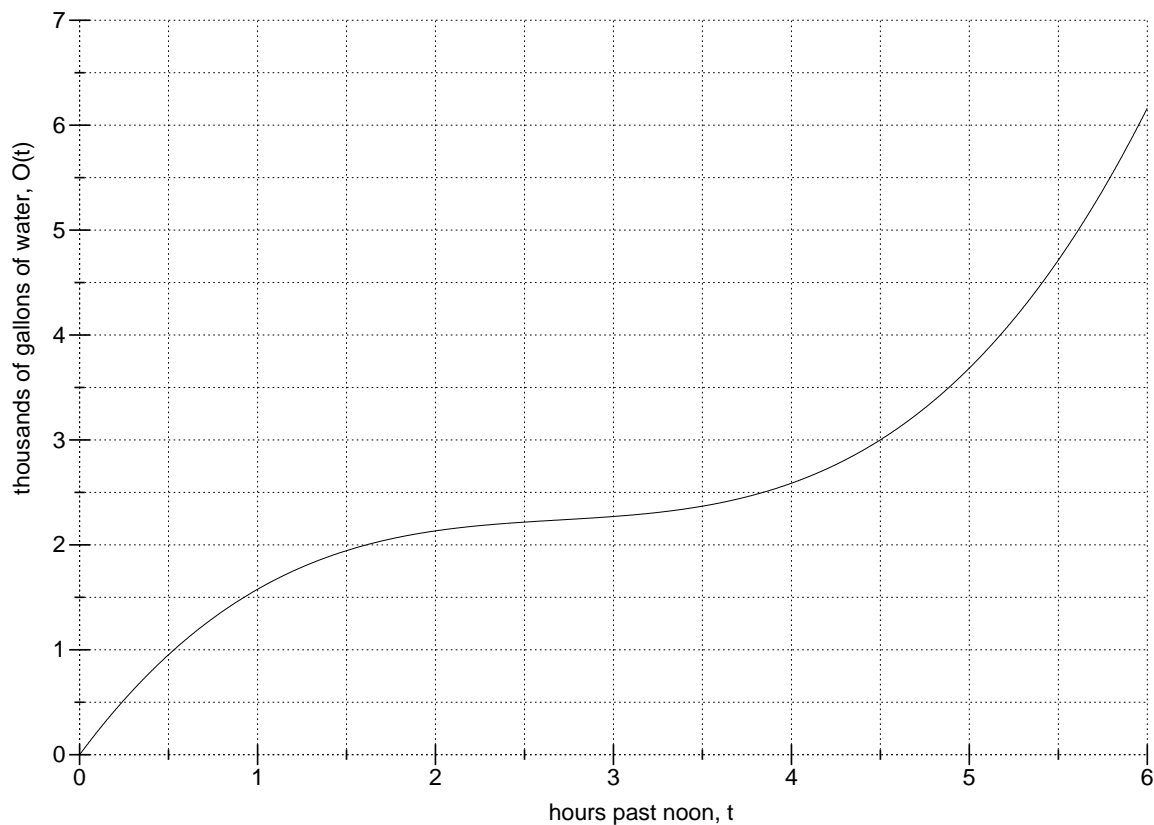
Section: _____

1	16	
2	14	
3	20	
Total	50	

- 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 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.
- Please check that your exam contains three problems and six pages.
- Put your name on your sheet of notes and turn it in with the exam.

GOOD LUCK!!

1. Below is the graph representing the total outflow of water $O(t)$ from a reservoir over the course of an afternoon.



- (a) (3 points) Compute the overall average rate of outflow at $t = 3$.

ANSWER: _____ thousand gallons per hour

- (b) (3 points) At what time is the overall average rate of outflow the lowest?

ANSWER: $t =$ _____ hours

- (c) (4 points) Suppose water flows into the reservoir at a rate of 0.9 thousand gallons per hour. What is the smallest amount of water that needs to be in the reservoir at noon so that there is never a shortage of water?

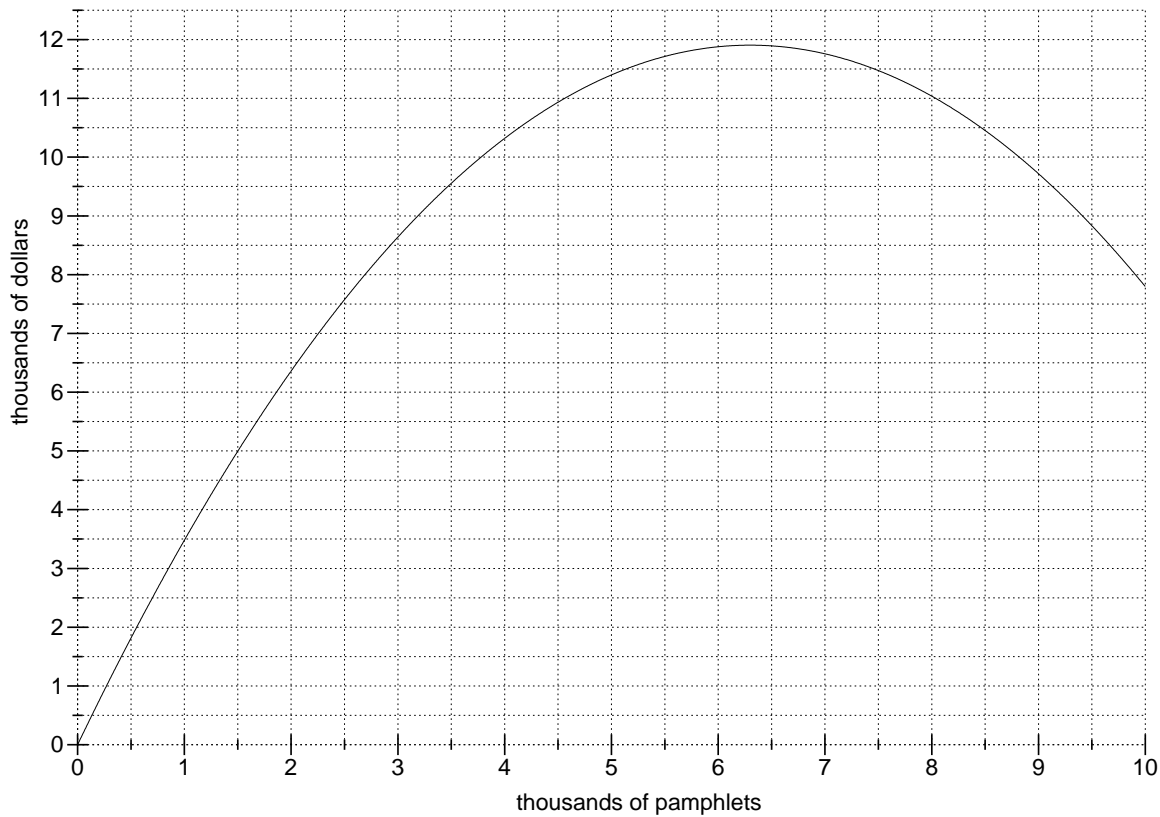
ANSWER: _____ thousand gallons

(d) (3 points) Translate the following into functional notation:

the average rate of outflow from $t = 1$ to $t = 5$

(e) (3 points) Translate the following into English: $O(5) - O(4)$.

2. You are making and selling pamphlets. Below is the graph of total revenue (TR) versus quantity (q).



- (a) (3 points) Compute marginal revenue (MR) at $q = 3.5$ thousand pamphlets.

ANSWER: $MR =$ _____ dollars

- (b) (3 points) You have a fixed cost (FC) of \$2000 and it costs you \$0.75 to produce each pamphlet. Sketch the graph of total cost (TC) on the axes above.

- (c) (2 points) Find two quantities at which $TR = TC$.

ANSWER: $q =$ _____ and _____ thousand pamphlets

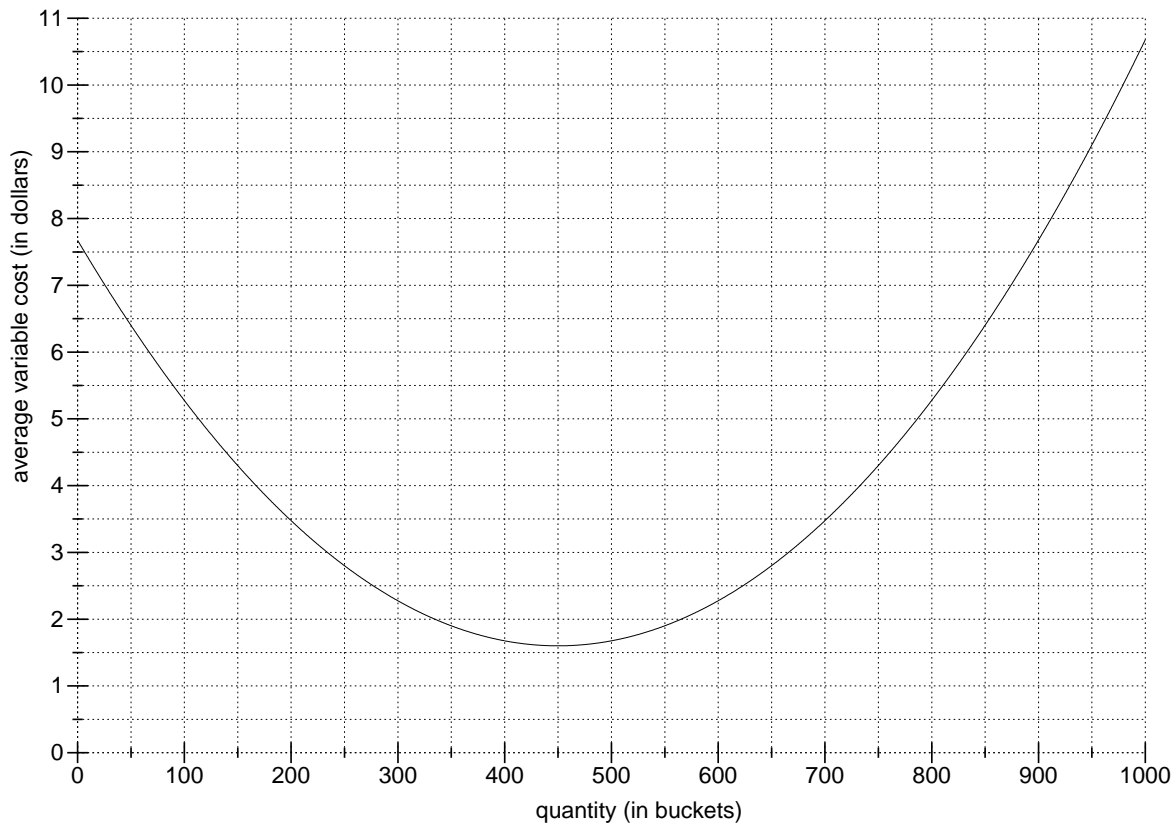
- (d) (3 points) What quantity will yield the maximum profit?

ANSWER: $q =$ _____ thousand pamphlets

- (e) (3 points) What is your maximum profit?

ANSWER: _____ thousand dollars

3. You are manufacturing and selling bologna buckets. Below is the graph of average variable cost (AVC) versus quantity (q).



- (a) (3 points) Compute the variable cost (VC) at 350 buckets.

ANSWER: $VC =$ _____ dollars

- (b) (3 points) Compute the change in variable cost (VC) that comes from increasing q from 100 to 300.

ANSWER: _____ dollars

(c) (4 points) Suppose you have fixed costs (FC) of \$1200. Compute the total cost (TC) of manufacturing and selling 800 buckets.

ANSWER: $TC =$ _____ dollars

(d) (4 points) Suppose you have fixed costs (FC) of \$1200 and that the market price for each bucket is \$4.80. What is the profit at $q = 600$?

ANSWER: profit = _____ dollars

(e) (3 points) What is the smallest value of average variable cost (AVC)?

ANSWER: _____ dollars

(f) (3 points) What is the shutdown price?

ANSWER: _____ dollars