

MATH 111C
Exam I - Version 1
October 23, 2003

Name _____

Student ID # _____

Section _____

1	16	
2	18	
3	16	
Total	50	

Current grades will be posted on the course website after each exam. Please check one of the following:

_____ I would like my grades to appear on the course website, listed by the last four digits of my student number.

_____ I would not like my grades to appear on the course website.

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- You must show your work on all problems. The correct answer with no supporting work may result in no credit.
- Write your answers in the specified locations. Unless otherwise indicated, you may round your **final answer** to two digits after the decimal.
- Put your name on your sheet of notes and turn it in with the exam.
- Any student found engaging in academic misconduct will receive a score of 0 on this exam.

GOOD LUCK!

1. (16 points) The following table gives several values of $A(t)$, the total amount of water (in thousands of gallons) that has flowed into a reservoir in the t hours since noon.

t	0	1	2	3	4	5	6	7	8	9	10
Total Amount $A(t)$	0	0.5	1.1	2.0	5.4	8.8	9.7	10.3	10.8	11.2	11.6

- (a) Compute the (incremental) average rate of flow into the reservoir from 3 p.m. to 9 p.m.

ANSWER: _____ thousand gallons per hour

- (b) At what value of t is the overall average rate of flow into the reservoir equal to 1.35?

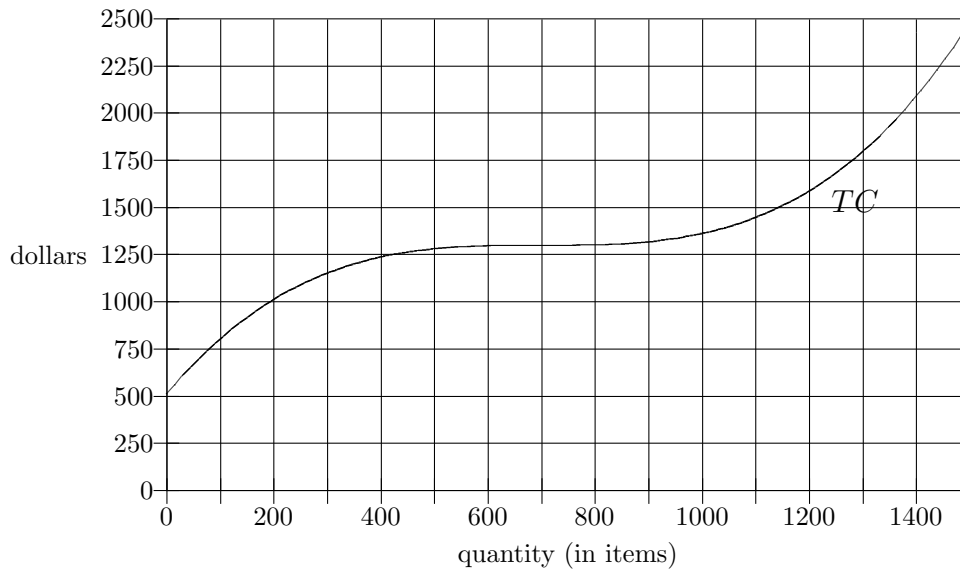
ANSWER: $t =$ _____

- (c) Translate the following into functional notation:

The incremental average rate of flow into the reservoir from time h to a time 3 hours later is 1.1 thousand gallons per hour.

- (d) Translate the following into English: $A(4 + h) - A(4) = 3$.

2. (18 points) You sell *items*. The following is the graph of total cost.



- (a) What is the value of fixed cost?

ANSWER: $FC = \$$ _____

- (b) Estimate the value of marginal cost (MC) at $q = 400$ items.

ANSWER: $MC = \$$ _____

- (c) What is the breakeven price?

ANSWER: $\$$ _____

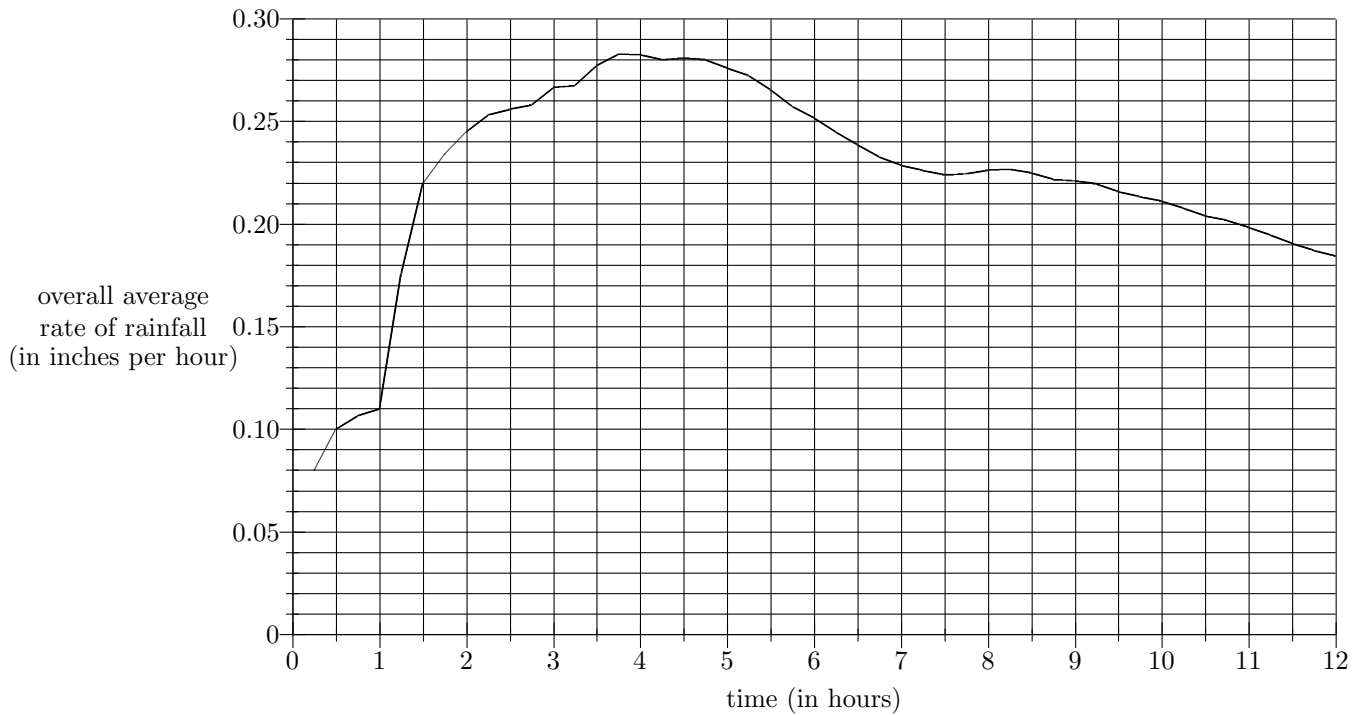
- (d) What is the average variable cost (AVC) at $q = 300$ items?

ANSWER: $AVC = \$$ _____

- (e) Items sell for \$2.50 each. Name the smallest quantity at which $TR = TC$.

ANSWER: $q =$ _____

3. (16 points) The following is the graph of the **overall average rate of rainfall** over a twelve-hour period on Monday, October 20, 2003, the rainiest day *ever*. That is, if $R(t)$ is the amount of rain that has fallen since $t = 0$, then this is the graph of $\frac{R(t)}{t}$.



- (a) Find all times at which the overall average rate of rainfall is 0.26 inches per hour.

ANSWER: $t =$ _____

- (b) Find the total amount of rain that had fallen by time $t = 7.5$.

ANSWER: _____ inches

- (c) How much rain fell from $t = 1$ to $t = 4$ hours?

ANSWER: _____ inches

- (d) What is the *incremental* average rate of rainfall from $t = 2$ to $t = 6$ hours?

ANSWER: _____ inches per hour