

Math 111 - Winter 2008

Exam 1

January 31, 2008

Name: _____

Quiz Section: _____

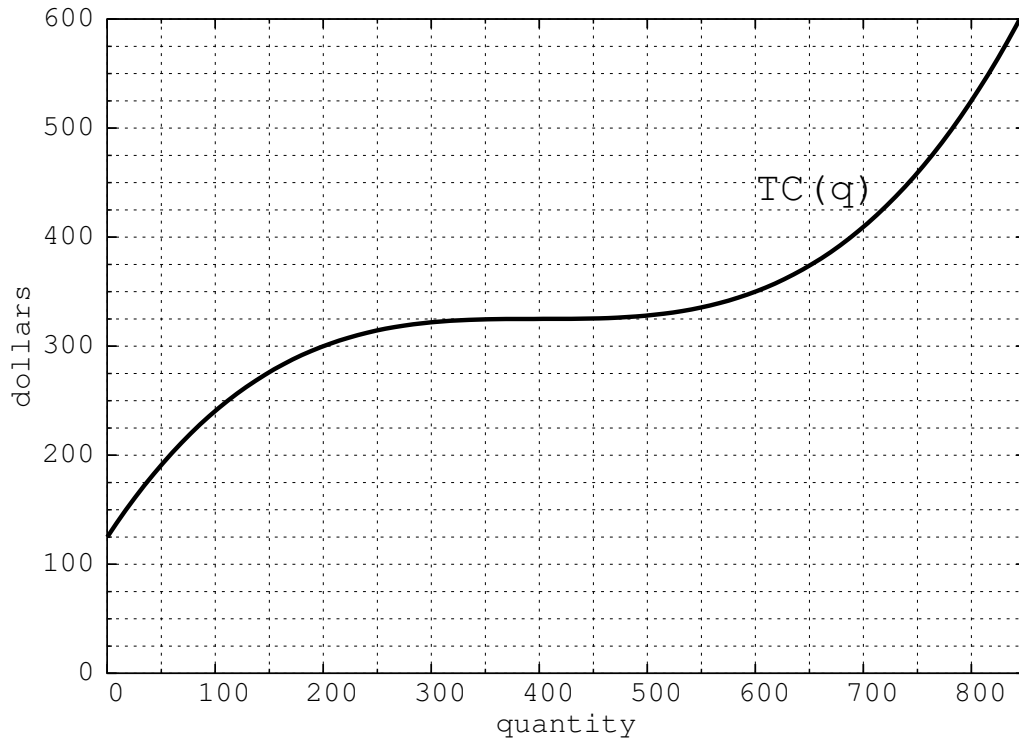
Student ID Number: _____

1	18	
2	16	
3	16	
Total	50	

- You are allowed to use a calculator, a ruler, and one **hand-written** 8.5 by 11 inch page of notes.
- Check that your exam contains all the problems listed above.
- You must **show and explain your work** on all problems. The correct answer with no supporting work may result in no credit. On problems in which you use a graph, draw lines and *clearly* label them in the graph.
- Raise your hand if you have a question.
- 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. All suspicious behavior will be reported to the student misconduct board. In such an instance, you will be force to meet in front of a board of professors to explain your actions. The board typically decides to either put a student on academic probation or to expel the student.
DO NOT CHEAT OR DO ANYTHING THAT LOOKS SUSPICIOUS!
WE WILL REPORT YOU AND YOU MAY BE EXPELLED!
- There are multiple versions of the exam so if you copy off a neighbor and put down the answers from another version we will know you cheated.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (18 points) Harry is selling Flumpits. The graph of the Total Cost, $TC(q)$, of producing q Flumpits is given below.



- (a) (4 pts) What is the value of the Variable Costs (VC) at $q=600$?

ANSWER: $VC(600) =$ _____ dollars

- (b) (4 pts) What is the additional cost of producing the 101st Flumpit?

ANSWER: $MC(100) =$ _____ dollars

- (c) (4 pts) What is the Breakeven Price (BEP)?

ANSWER: $BEP =$ _____ dollars

- (d) Assume the market price is $p = \$1.50$ per Flumpit and answer the following questions.

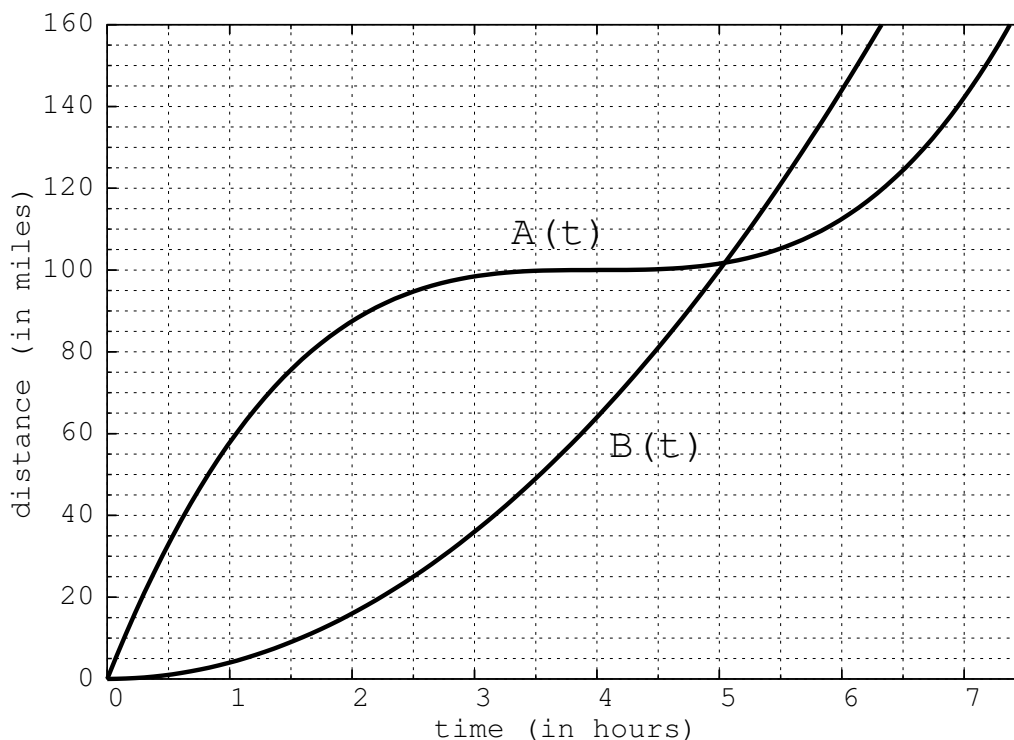
- i. (3 pts) What is Profit if $q=300$ Flumpits are sold?

ANSWER: Profit = _____ dollars

- ii. (3 pts) If Harry sells $q=150$ Flumpits, how much of his fixed cost does he recover?

_____ dollars

2. (16 points) Two cars, A and B , are traveling on the same road. Let $A(t)$ and $B(t)$ represent the distance at time t for Car A and Car B , respectively. At time $t = 0$, the distance between the cars is zero.



- (a) (4 pts) What is the lowest average (overall) trip speed for Car A ?

ANSWER: _____ miles per hours

- (b) (4 pts) Find a 2-hour time interval over which the average (incremental) speed for Car B is 30 mph.

ANSWER: from $t =$ _____ to $t =$ _____ hours

- (c) (4 pts) Find a one-hour interval over which Car A and Car B have the same average speed?

ANSWER: from $t =$ _____ to $t =$ _____ hours

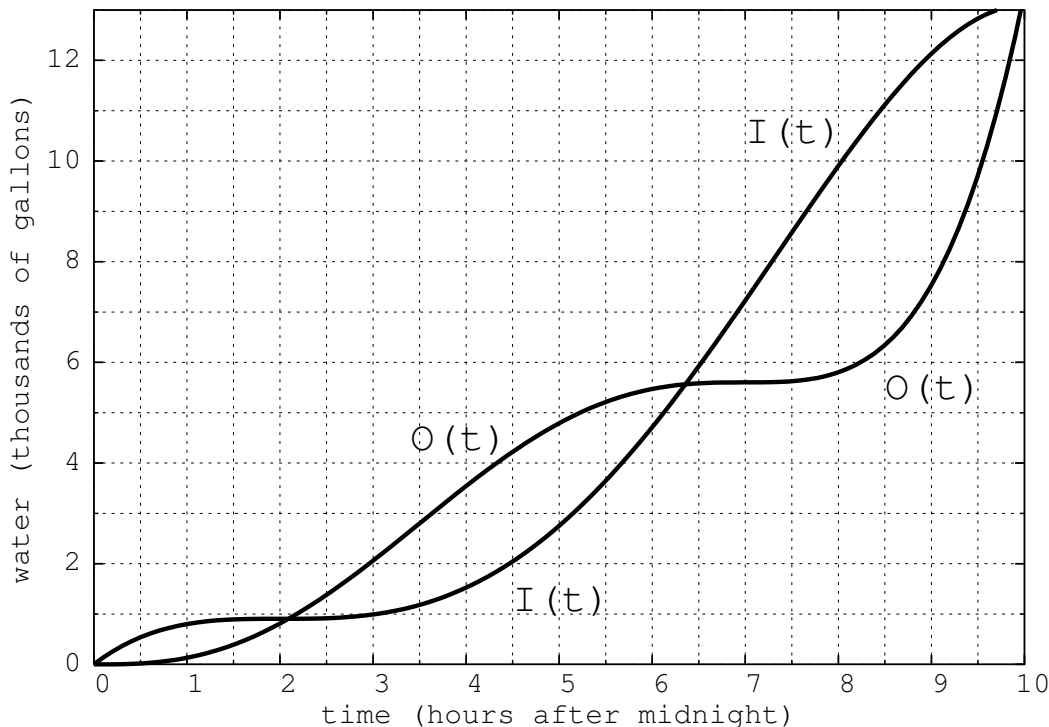
- (d) (4 pts) Translate the following into English: $\frac{B(4)}{4} < \frac{A(5) - A(3)}{2}$.

And determine if the statement is true or false.

Translation:

ANSWER: (circle one) TRUE FALSE

3. (16 points) Ron estimates the total flow into and out of a water reservoir that will occur after midnight. The total amount of water that has flowed into a reservoir at time t is denoted $I(t)$ and the total amount of water that has flowed out is $O(t)$. The graphs of $O(t)$ and $I(t)$ are given below.



- (a) (4 pts) What is the least amount of water needed in the reservoir at midnight to guarantee the reservoir has enough water for the whole ten hours?

ANSWER: _____ thousand gallons

- (b) (4 pts) Name the longest time interval over which the average overall rate of flow *into* the reservoir is decreasing.

ANSWER: from $t=$ _____ to $t=$ _____ hours

- (c) (4 pts) Give all time intervals in which t satisfies $\frac{O(t+0.1) - O(t)}{0.1} > \frac{I(t+0.1) - I(t)}{0.1}$.

ANSWER: _____

- (d) (4 pts) Translate the following into functional notation and give the value(s) of t that make it true:

“The (incremental) rate of flow *out* of the reservoir from time t to two-hours later is 2 thousand gallons per hours.”

Translation:

ANSWER: $t=$ _____