

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 111
Midterm I
January 26, 2006

Problem 1	11	
Problem 2	12	
Problem 3	15	
Problem 4	12	
Total:	50	

- You are allowed to use a calculator, a ruler, and one sheet of notes.
- Your exam should contain 5 pages in total and 4 problems. Please check your test now.
- You **must explain how you get your answers**. Correct (or incorrect) answers with no supporting work may result in little or no credit. On problems in which you use a graph, draw lines and indicate points clearly.
- Write your **final answer in the indicated spaces**. Unless otherwise noted, round your answer to two decimal digits.
- If you need more room, use the backs of pages and indicate to the reader that you have done so. If you still need more paper, ask your TA for some more, write your name and section on it and make sure you turn it in to your TA inside your test.
- Raise your hand if you have a question.

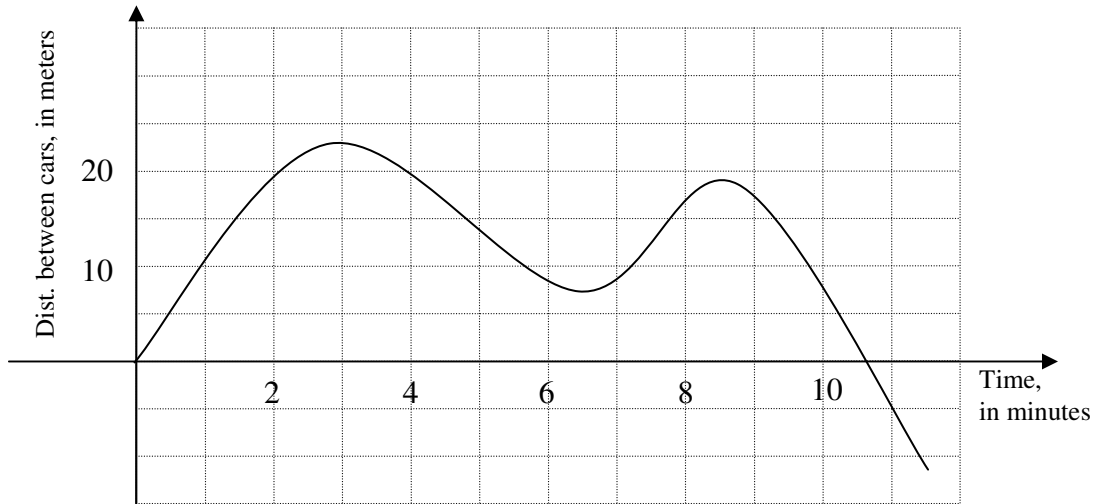
GOOD LUCK!

Do you want me to post your grade so far next week on the class website under the last 4 digits of your student ID?

Yes, please post my grade. Sign to give permission: _____

No, please don't post my grade so far.

1 (11 points: 3+4+4) Two cars, one Green and one Red, race each other starting from the same place. The graph below shows the distance **between** the two cars, from the start to the end of the race (when the graph is positive, the Green car is ahead.)



a) Who won the race?

Answer: The _____ car.

Explain:

b) Which car traveled farthest in the 5th minute (from $t=4$ to $t=5$)?

Answer: The _____ car.

Explain:

c) How much faster is the average speed of the Green car than the average speed of the Red car from 1 minute to 3 minutes into the race?

Answer: The Green car drives _____ meters per minute faster than the Red.

Work:

2. (12 points: 3+4+5) The following table shows dollar amounts withdrawn from an ATM Cash machine over **half-hour** intervals, from noon to 5pm.

Interval starts at t=	noon	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30
\$ withdrawn	100	240	100	140	100	80	80	120	80	180

a) How much money did the ATM dispense from 2 to 4 pm? Answer: _____ dollars.

Work:

b) What is the average rate of withdrawal from noon to 2:30 pm? Answer: _____ dollars/hr.

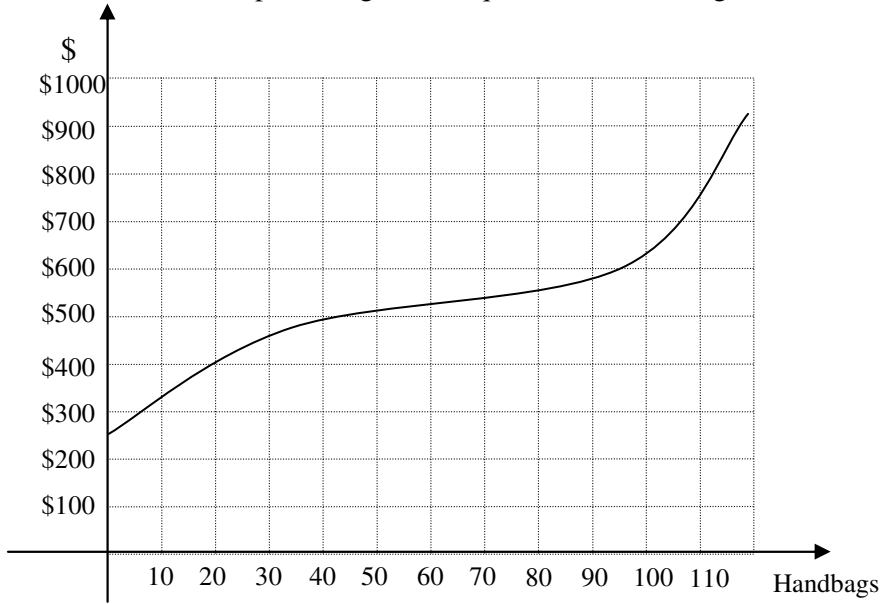
Work:

c) Suppose the bank deposits money into the ATM at the rate of \$200 **every hour** (i.e. \$200 at noon, then an additional \$200 at 1 pm, etc.) What's the minimum amount of money the ATM has to contain right before noon so that it does not run out of money?

Answer: At least _____ dollars.

Work:

3. (15 points: 2+3+3+3+4) You own a small business producing specialty handbags. The graph below shows your Total Cost (TC) for producing various quantities of handbags.



a) How much is your fixed cost?

Answer: _____ dollars.

Explain:

b) What is your Marginal Cost to produce the 31st bag?

Answer: _____ dollars.

Explain:

c) Suppose the current market price is \$7.50 per bag. How many bags should you produce to earn the most profit?

Answer: _____ handbags.

Explain:

These questions refer to the same graph above:

d) Suppose you produce 80 handbags.

What is your Average Cost per bag?

Answer: _____ dollars.

Work:

e) Suppose the current market price is \$6 per handbag.

Can you earn any profit?

Circle one: yes/no and explain.

At this market price, should you produce any handbags whatsoever?

Circle one: yes/no and explain.

4. (12 points:4+4+4) Let $D(t)$ denote the distance (in miles) traveled by a bicyclist after t hours.

a) Translate into English: "Find a t such that $\frac{D(t)}{t} = 8$ ".

Translation:

b) Translate into functional notation: "The average trip speed of the bicyclist after 2 hours is less than his average speed from 2 to 5 hours.

Translation:

c) Suppose that after t hours (between 0 and 5) the distance traveled is given by the quadratic expression $D(t) = -t^2 + 10t$ miles. Use this expression to determine at what time during these five hours did the bicyclist travel 3 miles?

Answer: after _____ hours.

Work: