

NAME: \_\_\_\_\_

Student ID #: \_\_\_\_\_

QUIZ SECTION: \_\_\_\_\_

**Math 111 D**  
**Midterm I**  
October 19<sup>th</sup>, 2006

Problem 1	6	
Problem 2	10	
Problem 3	14	
Problem 4	20	
<b>Total:</b>	<b>50</b>	

- You are allowed to use a calculator, a ruler, and one sheet of notes.
- Your exam should contain 4 pages in total and 4 problems. Please check that your test is complete!
- 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, label them, and mark 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.
- 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?*

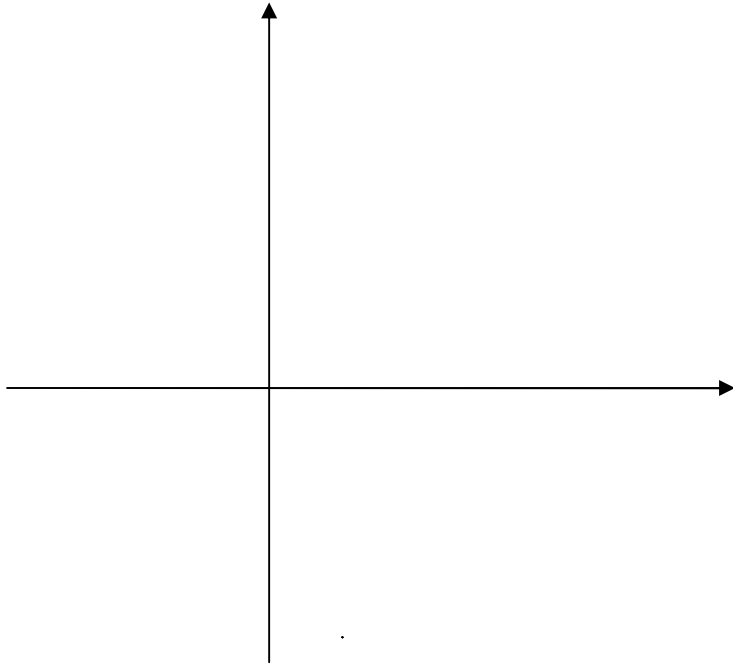
*Yes, please post my grade. Sign to give permission: \_\_\_\_\_*

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

1 (6 points) Graph the following quadratic function:  $f(x) = \frac{1}{2}x^2 - 2x - 6$ .

Label both coordinates of its vertex. Also, label its intersection points with the x-axis.

(Show work and indicate which formulas you used – using a graphing calculator will not get much credit)



2 (10 points: 3+3+4) The following table indicates the (incremental) average rate of water usage from a reservoir, over successive 5 minute time intervals.

Time interval (in min.)	0 → 5	5 → 10	10 → 15	15 → 20	20 → 25	25 → 30	30 → 35	35 → 40	40 → 45
Rate of Usage (in gallons per min)	3.5	1.7	2	2.8	3.3	4.4	10	2.9	5

a) How much water was used during the first 5 minutes?

Work:

Answer: \_\_\_\_\_ gallons.

b) How much water was used from t=15 to t=30 minutes?

Work:

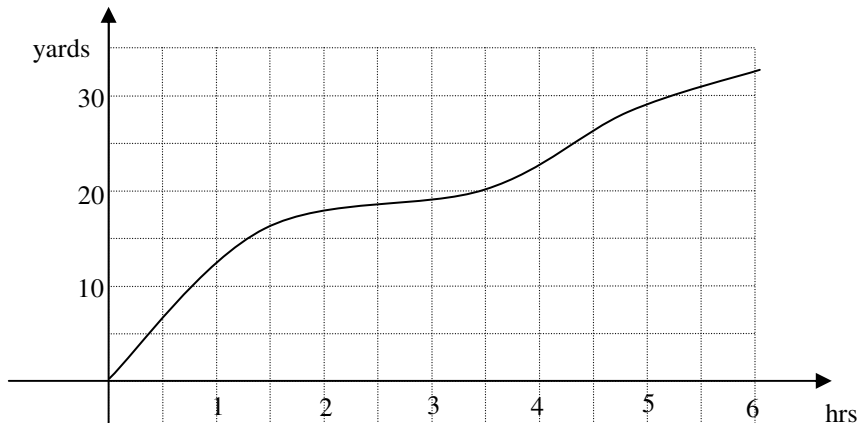
Answer: \_\_\_\_\_ gallons.

c) What was the overall average rate of water usage, over the entire 45 minutes?

Work:

Answer: \_\_\_\_\_ gallons per minute.

3 (14 points: 4+4+6) The graph below represents the distance  $D(t)$  (in yards) traveled by the Mars Rover vehicle at time  $t$  (in hours), starting at noon.



a) What was the average trip speed of the Rover two hours into the trip? (include units)

Answer: \_\_\_\_\_ Units: \_\_\_\_\_

b) Find a one hour time interval over which the Rover traveled 2.5 yards.

Answer: from  $t =$  \_\_\_\_ to  $t =$  \_\_\_\_\_ hours.

c) Consider the following statement in functional notation:  $\frac{D(2+3) - D(2)}{3} > \frac{D(2)}{2}$ .

i) Translate it into English:

Answer:

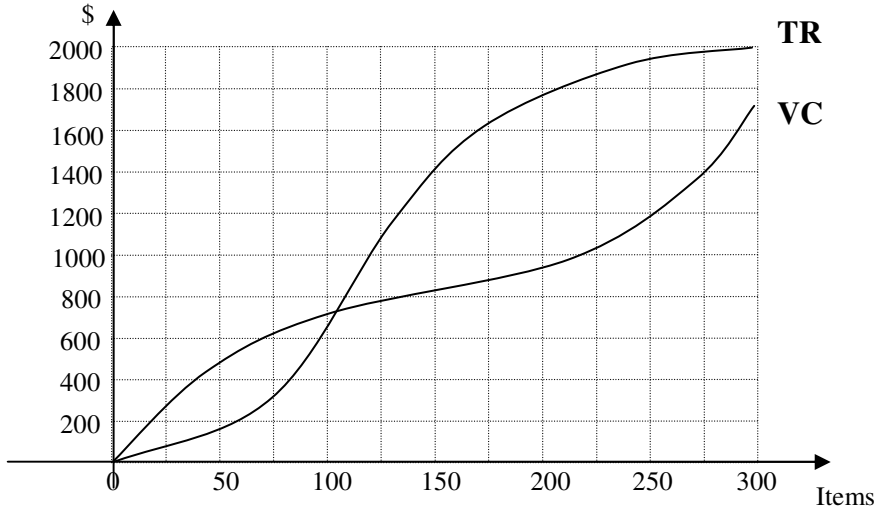
ii) Translate it into graph language:

Answer:

iii) Use the graph to determine if the statement true or false.

Answer (circle one): True or False

4 (20 points) The following are the graphs of the the total revenue (TR) and the variable cost (VC), in dollars, for producing and selling Items.



a) For this VC curve, what is the shutdown price in a market price situation?

Work:

Answer: SDP = \_\_\_\_\_ \$ per Item.

b) What is the Average Revenue from selling 50 Items?

Work:

Answer: AR(50) = \_\_\_\_\_ \$ per Item.

c) Give an interval of quantities  $q$  over which the marginal revenue MR is decreasing.

Work:

Answer: from  $q =$  \_\_\_\_\_ Items to  $q =$  \_\_\_\_\_ Items

d) Suppose the fixed cost is \$250. Find the maximum profit, and at what quantity  $q$  it occurs.

Work:

Answer: Maximum profit is \$ \_\_\_\_\_ for  $q =$  \_\_\_\_\_ Items