

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

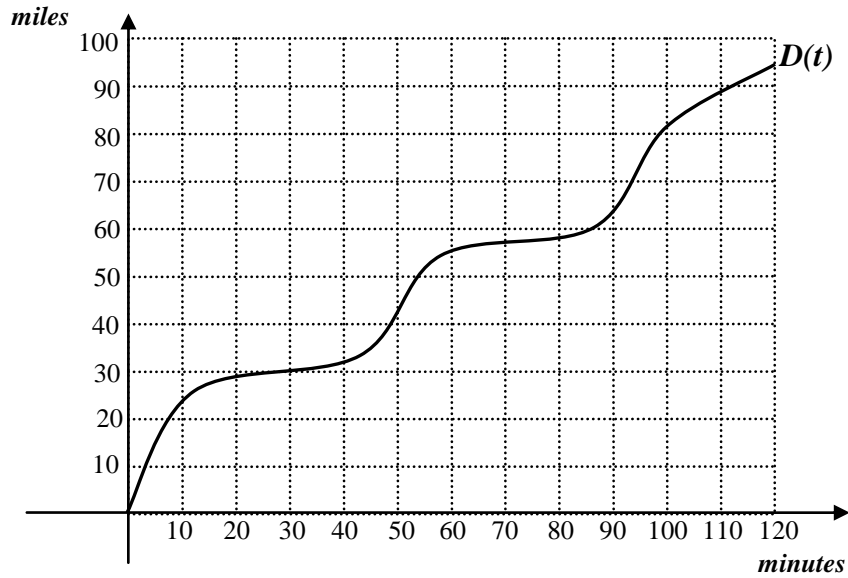
Math 111
Midterm I
October 29, 2009

Problem 1	12	
Problem 2	10	
Problem 3	13	
Problem 4	15	
Total:	50	

- You are allowed to use a calculator, a ruler, and one double-sided sheet of notes.
- Your exam should contain 4 pages in total and 4 problems. Check that your test is complete!
- You **must indicate how you get your answers**. Correct (or incorrect) answers with no justification may result in little or no credit.
- On problems in which you use a graph, **carefully draw all lines you use, label them**, and mark all points clearly.
- Write your **final answer in the indicated spaces**.
- 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!

1 (12 pts) The following is the graph of the distance $D(t)$ traveled by a car at time t minutes, during a two hour trip.



a) Compute the car's average speed from 20 to 40 minutes. Show work.

ANSWER: _____ miles per minute

b) What was the car's lowest average trip speed? Show work.

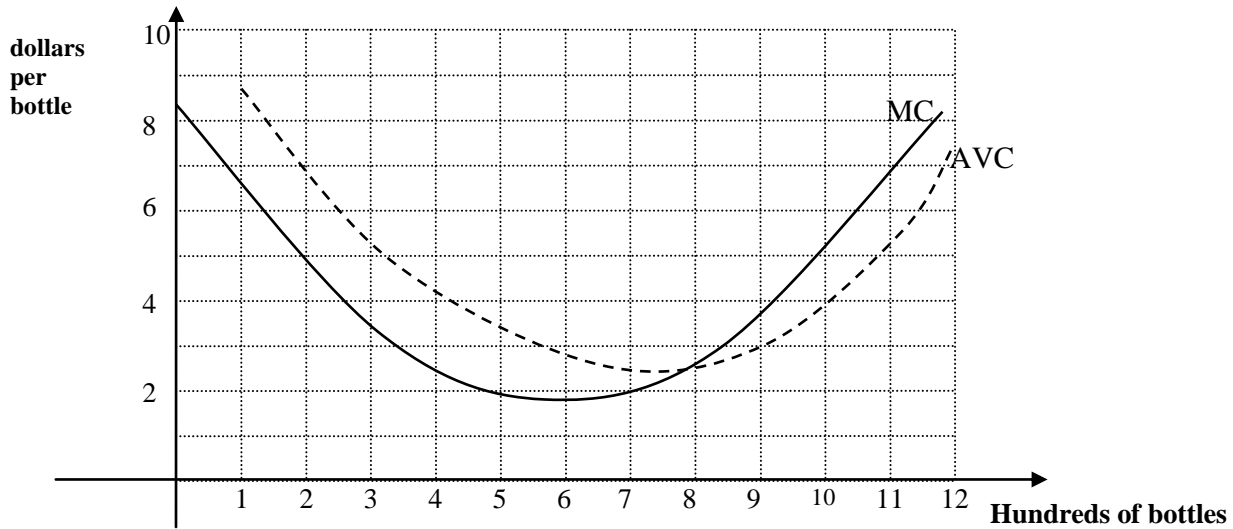
ANSWER: lowest ATS = _____ miles per minute

c) Draw an appropriate reference line and use it to find two different times t at which the following equality is true:

$$\frac{D(t + 10) - D(t)}{10} = 0.3$$

ANSWER: at $t =$ _____ **and** at $t =$ _____ minutes

2 (10 points) You produce and sell bottles of Love Potion #9. The graphs below represent your marginal cost (MC) and the average variable cost (AVC), in dollars per bottle. Note that the quantity q is in hundreds of bottles.



a) What is the shutdown price?

ANSWER: SDP = _____ dollars per bottle

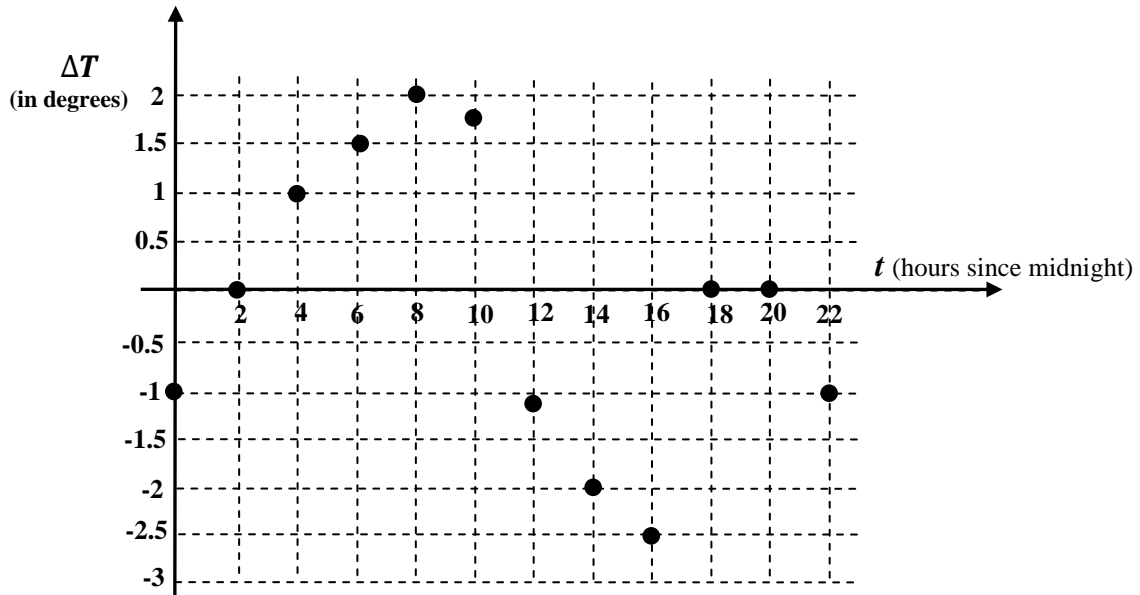
b) If every bottle sells at a market price of \$4 per bottle, what quantity maximizes your profit?

ANSWER: q = _____ hundred bottles

c) Your fixed costs are \$100. What is your total cost for producing 9 hundred bottles? Give your answer in dollars.

ANSWER: $TC(9)$ = _____ dollars

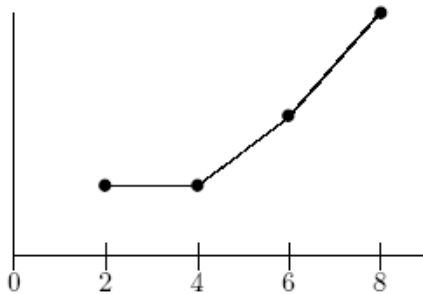
3 (13 pts) The following graph shows the **change in temperature**, in degrees Farenheit, every two hours, over a 24-hour period beginning at midnight. Each dot on the graph represents the change in temerature over the *next* two hours.



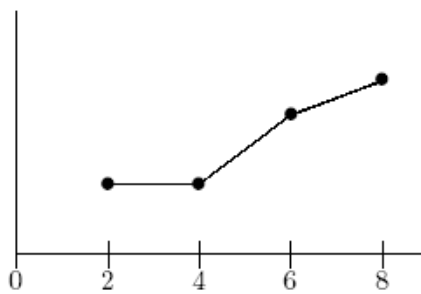
a) What was the change in temperature from 4am to 8am?

ANSWER: _____ degrees

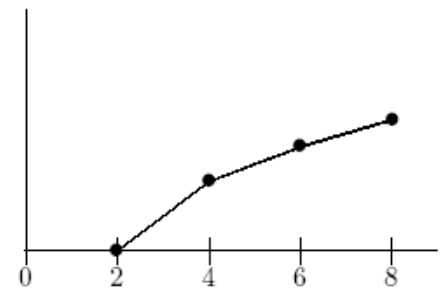
b) Which of the following three graphs most closely resembles the **temperature** graph from $t=2$ to $t=8$? Circle one, no justification needed.



(i)



(ii)



(iii)

c) For each of the following statements, **circle True (T) or False (F)**. No need to show work.

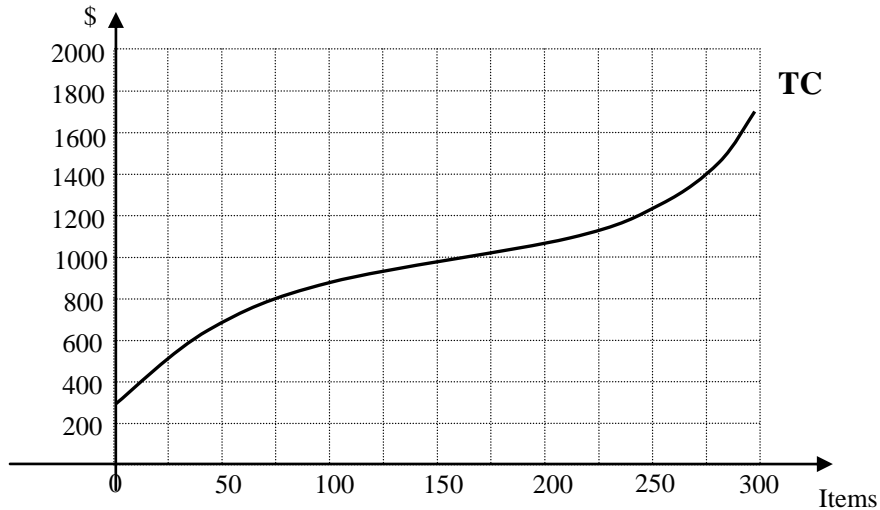
T F The temperature is higher at $t=10$ than at $t=12$.

T F The temperature is higher at $t=16$ than at $t=18$.

d) Compute the average rate of change of temperature from midnight to 10 am. Show work, and correct units.

ANSWER: _____ Units: _____

4 (15 points) The following graph shows the total revenue (TC), in dollars, for producing Items.



a) What is the Average Cost from selling 150 Items?

Answer: $AC(150) =$ _____ \$ per Item.

b) What is the Average Variable Cost from selling 75 Items?

Answer: $AVC(75) =$ _____ \$ per Item.

c) How much does it cost to produce the 76th item?

Answer: _____ \$ (per Item).

d) Find an interval of quantities that's 50 items long, over which the marginal cost MC is increasing but the average cost AC is decreasing.

Answer: from _____ items to _____ items

e) Suppose each item sells at a market price of \$6. Which quantity maximizes your profit?

Answer: Maximum profit is obtained at $q =$ _____ Items