

MATH 111  
Exam I - Version 1  
October 28, 2004

Name \_\_\_\_\_

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

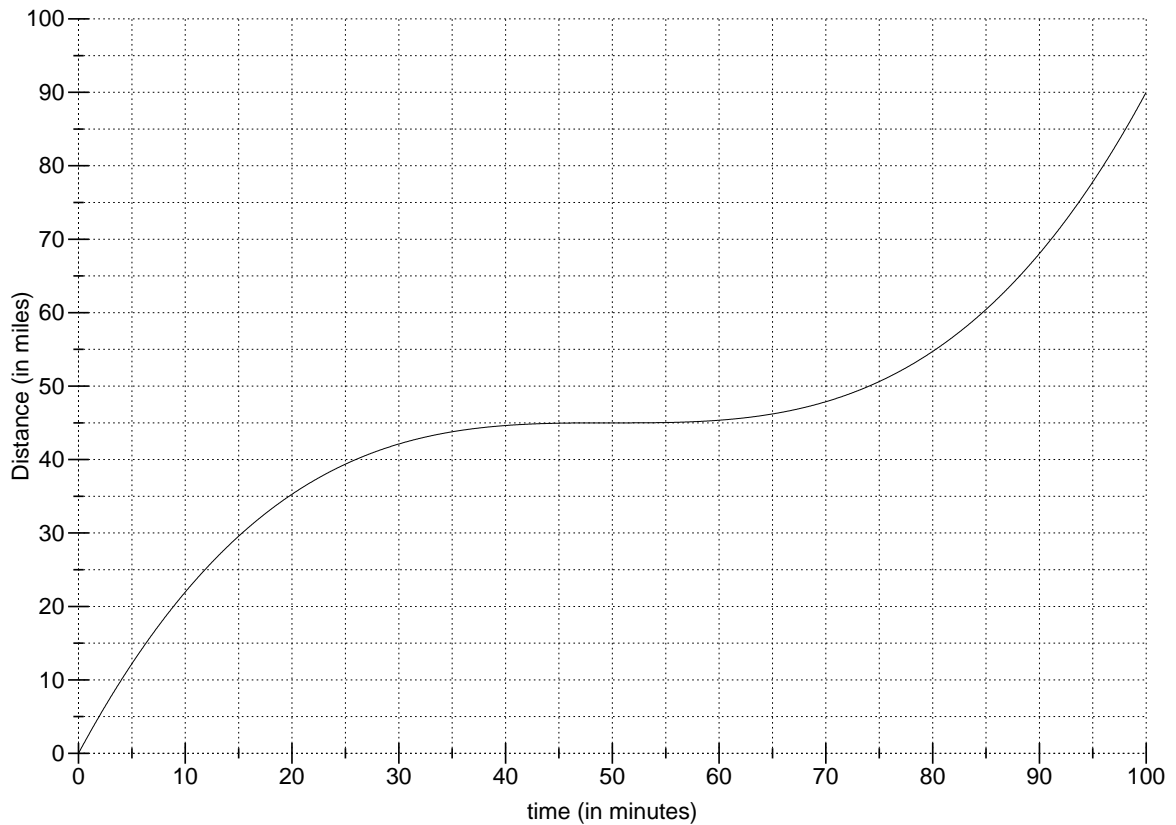
Section \_\_\_\_\_

1	15	
2	12	
3	11	
4	12	
Total	50	

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- Check that your exam contains four problems.
- You must show 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 mark points clearly on the graph.
- Write your answers in the specified locations. Unless otherwise indicated, you may round your **final answer** to two digits after the decimal.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so. If you still need more paper, please ask for some.
- 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.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (15 points) The following is the graph of  $D(t)$ , distance versus time for a car.



- (a) Compute the car's average speed from  $t = 30$  to  $t = 80$ .

ANSWER: average speed = \_\_\_\_\_mpm

- (b) Find a time  $t$  at which the car's average trip speed is 0.8 mpm.

ANSWER:  $t =$  \_\_\_\_\_minutes

- (c) Find a time  $t$ , larger than 50, at which the car's average speed over the next five minutes is 0.8 mpm.

ANSWER:  $t =$  \_\_\_\_\_minutes

- (d) What is the car's lowest average trip speed?

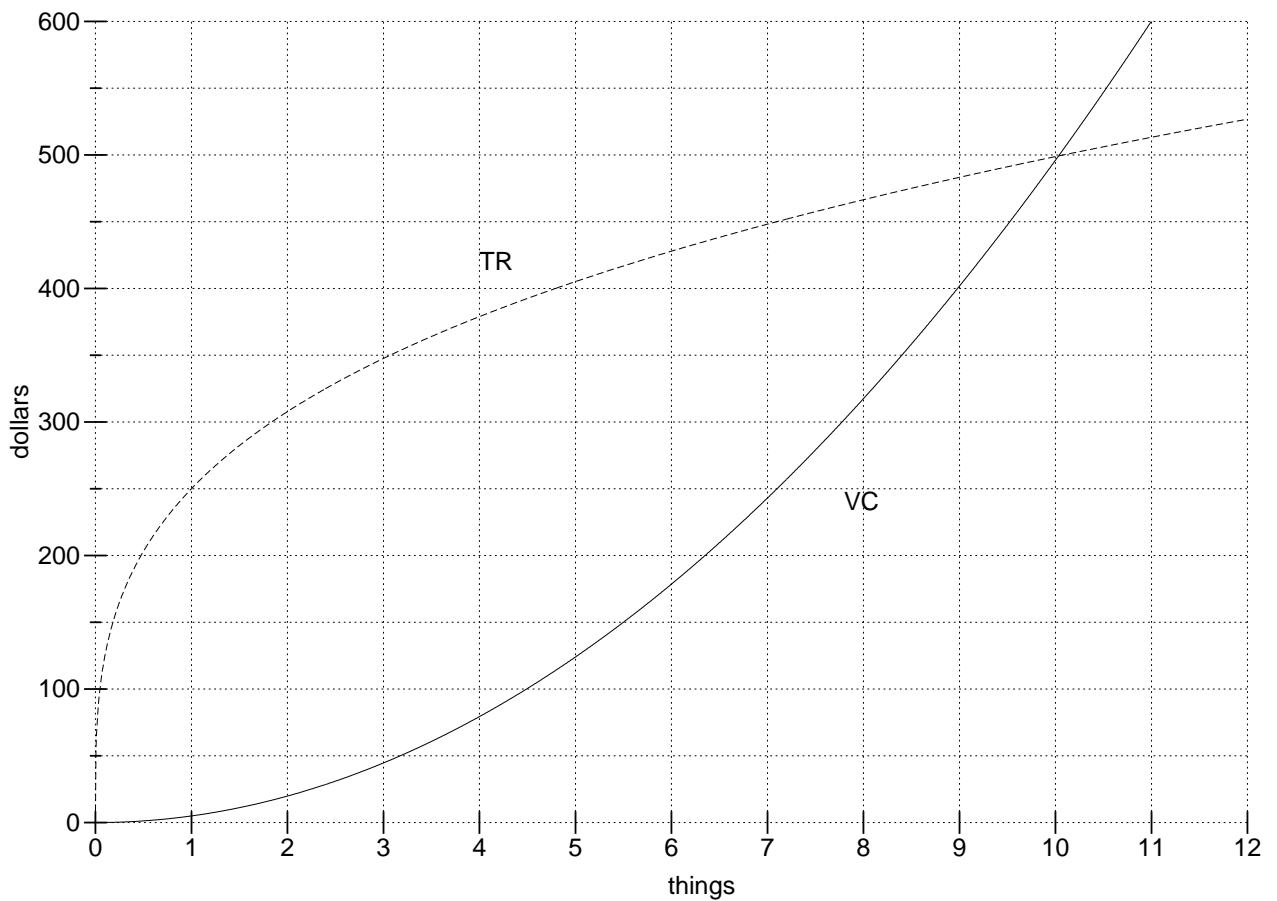
ANSWER: \_\_\_\_\_mpm

- (e) Give two values of  $h$  such that

$$\frac{D(15+h) - D(15)}{h} = \frac{1}{3}.$$

ANSWER:  $h =$  \_\_\_\_\_and \_\_\_\_\_

2. (12 points) You are in the business of manufacturing and selling *things*. Below is a graph of total revenue (TR) and variable cost (VC) for your business. Your fixed costs (FC) are \$70.



- (a) Compute the average variable cost ( $AVC$ ) and average cost ( $AC$ ) for producing 7 things.

ANSWER:  $AVC(7) = \$$  \_\_\_\_\_ per thing

$AC(7) = \$$  \_\_\_\_\_ per thing

- (b) Compute the marginal revenue ( $MR$ ) at  $q = 4$ .

ANSWER:  $MR(4) =$  \_\_\_\_\_ dollars

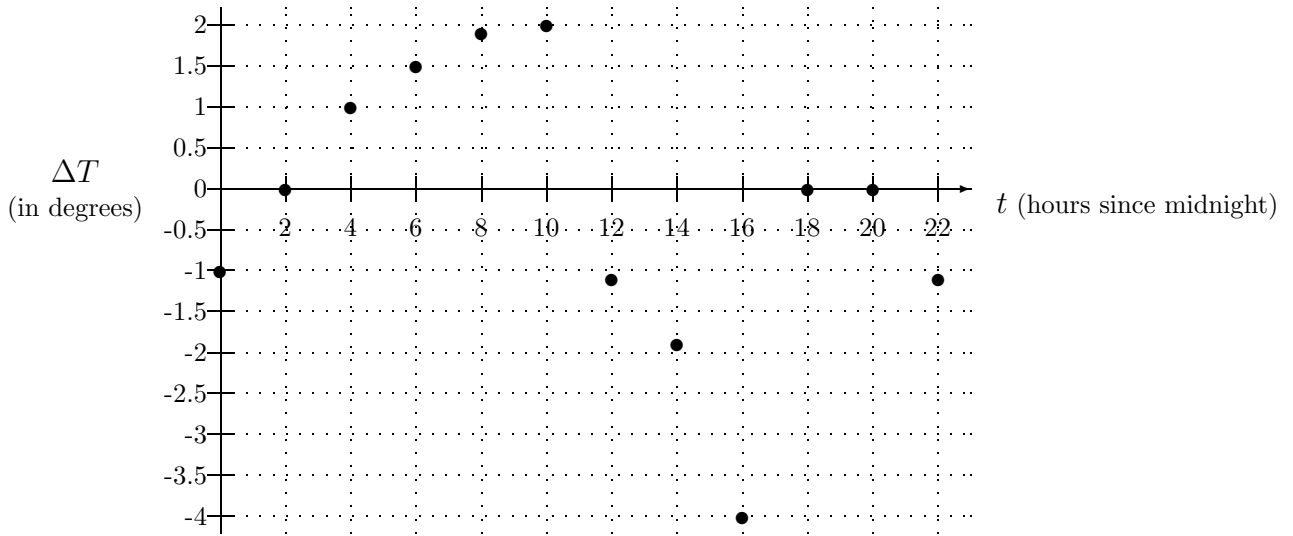
- (c) What is your maximum possible profit? (Don't forget that you have fixed costs.)

ANSWER: \_\_\_\_\_ dollars

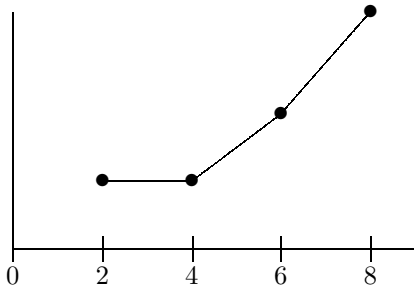
- (d) Find a value of  $q$  at which  $AR = AVC$ .

$q =$  \_\_\_\_\_

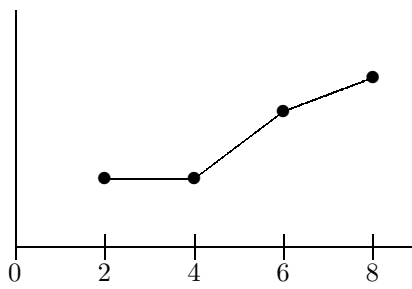
3. (11 points) The following graph gives the **change in temperature** in degrees Fahrenheit every two hours over a 24-hour period beginning at midnight. Each dot on the graph indicates the change in temperature over the *next* two hours.



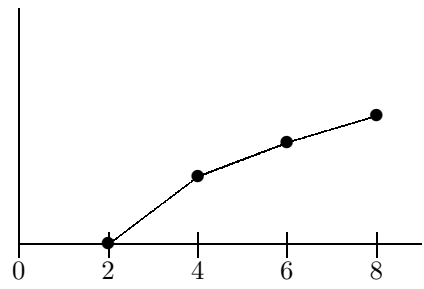
- (a) Which of the following graphs most closely resembles the graph of temperature from  $t = 2$  to  $t = 8$ ?



(i)



(ii)



(iii)

ANSWER: (circle one) (i) (ii) (iii)

- (b) For each of the following, indicate whether the statement is True (T) or False (F) by circling the correct letter.

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

**T F** The temperature at  $t = 2$  is lower than the temperature at  $t = 4$ .

**T F** The temperature at  $t = 6$  is the same as the temperature as the temperature at  $t = 0$ .

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

**T F** The temperature falls from  $t = 12$  to  $t = 18$ .

- (c) What is the change in temperature from 4 a.m. to noon?

ANSWER: \_\_\_\_\_ degrees

4. (12 points)

(a) Find the values of  $q$  for which  $TR = TC$  if

$$TR = -q^2 + 27q \text{ and } TC = 70 + 10q.$$

ANSWER:  $q =$  \_\_\_\_\_ and  $q =$  \_\_\_\_\_

(b) ( points) Find the intersection of the two lines:

$$y - 5x = 3 \text{ and } 10x - y = 1.$$

ANSWER:  $x =$  \_\_\_\_\_ and  $y =$  \_\_\_\_\_

(c) ( points) Solve for  $x$ :

$$R = \frac{2x + 1}{x}.$$

ANSWER:  $x =$  \_\_\_\_\_