

MATH 111  
Exam I - Version 1  
February 1, 2005

Name \_\_\_\_\_

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

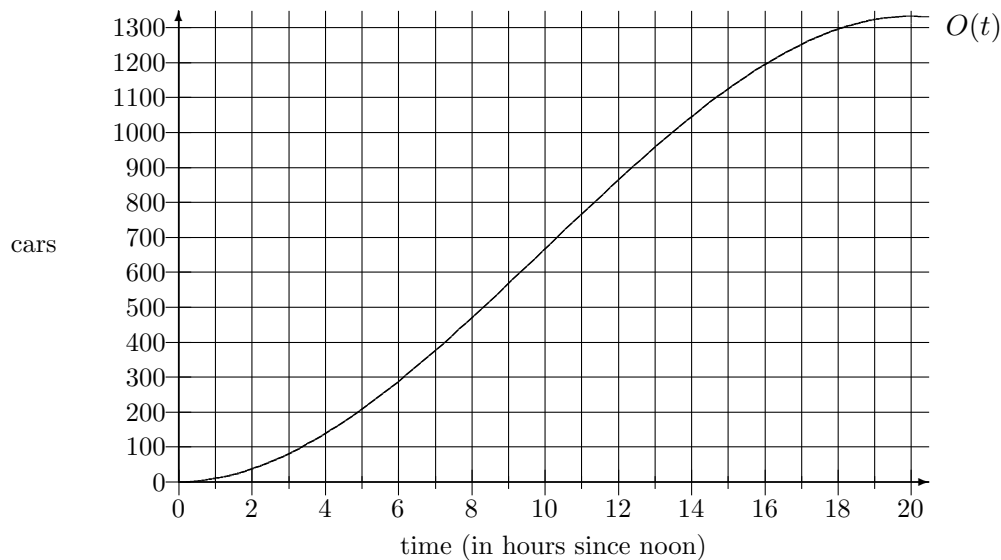
Section \_\_\_\_\_

1	12	
2	12	
3	12	
4	6	
5	8	
Total	50	

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- Please check that your exam contains five problems.
- Please turn your cell phone OFF and put it away for the duration of the exam.
- Unless otherwise indicated, you must show your work. On graphical questions, clearly draw any lines and mark any points that you use in your computations. The correct answer with no supporting work may result in no credit.
- Write your answers in the specified locations.
- 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.
- When rounding is necessary, round your **final answer** to two digits after the decimal.
- Raise your hand if you have a question.
- Put your name on your sheet of notes and turn it in with the exam.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (12 points) The graph below shows  $O(t)$ , the number of cars that leave an airport parking lot during the  $t$  hours since noon. There are 3,000 cars in the lot at noon.



- (a) On average, how many cars per hour leave the lot between 4 and 8 p.m.?

ANSWER: \_\_\_\_\_ cars per hour

- (b) Name the time at which the overall rate of flow out of the lot is highest.

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

- (c) Suppose that cars enter the lot at the rate of 100 cars every two hours. Name the time at which the number of cars in the lot returns to 3,000.

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

2. (12 points) A car moves along a long, straight road. The following chart shows the car's average speed over the ten-minute interval beginning at time  $t$  minutes.

interval starts at $t =$	0	10	20	30	40	50
$AS$ (miles per minute)	0.75	0.89	1.02	0.99	1.04	0.78

- (a) How far did the car travel from  $t = 20$  to  $t = 40$ ?

ANSWER: \_\_\_\_\_ miles

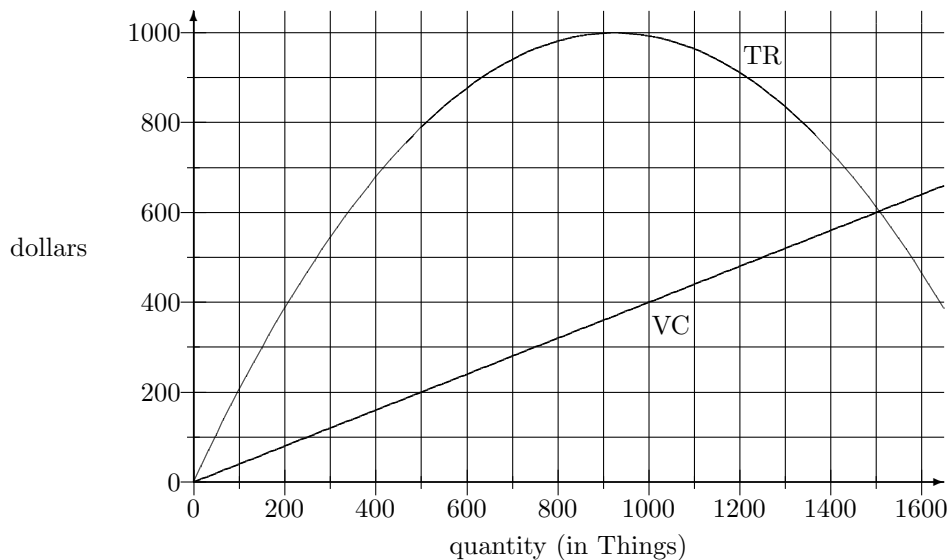
- (b) On average, how fast does the car go (in miles per minute) during the first 30 minutes of the trip?

ANSWER: \_\_\_\_\_ mpm

- (c) Compute the car's average speed from  $t = 30$  to  $t = 60$ .

ANSWER: \_\_\_\_\_ mpm

3. (12 points) The graph below shows the total revenue ( $TR$ ) and variable cost ( $VC$ ) for selling Things.



- (a) Compute the marginal revenue ( $MR$ ) at  $q = 300$  Things.

ANSWER:  $MR(300) =$  \_\_\_\_\_

- (b) Find the longest interval over which average revenue ( $AR$ ) is between \$0.50 and \$0.80 per Thing.

ANSWER: from  $q =$  \_\_\_\_\_ to  $q =$  \_\_\_\_\_ Things

- (c) Suppose that your fixed costs total \$300 (i.e.  $FC = 300$ ). What size order will maximize your profit and what is the maximum possible profit?

ANSWER:  $q =$  \_\_\_\_\_ Things; max profit = \$ \_\_\_\_\_

4. (6 points) Let  $P(t)$  represent the temperature on your front porch  $t$  hours after midnight.
- (a) Translate the following into functional notation: “The temperature rises 7.8 degrees during the three hours beginning at time  $t$ .”

(b) Translate the following into English:  $\frac{P(5) - P(0)}{5} > \frac{P(11) - P(6)}{5}$

5. (8 points) Solve for  $x$ .

(a)  $8x - 4(x + 2) = 10(3x - 5) + 7$

(b)  $px - 4(x + y) = 10(x - 5) + x$