Math 111
Exam 1
October 27, 2015

Name: _____

Quiz Section: _____

Student ID Number: _____

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- Check that your exam contains four pages of problems in addition to this cover page.

- You are allowed to use a Ti-30x IIS Calculator, a ruler, and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.

- You must **show your work** on all problems. On problems in which you use a graph, draw lines and *clearly* label them in the graph. Your work and explanations on each problem should be very brief, so you should be able to fit them in the space provided. However, if you want more space, you can write on the backs of the previous page and indicate to the grader that you have done so.

- Put your final answer on the lines provided with the problems.

- Raise your hand if you have a question. Your TA can only clarify the wording of a question, he/she cannot comment on your work.

- There are multiple versions of the exam so if you copy off a neighbor and put down the answers from another version we will know you cheated. Any student found engaging in academic misconduct will receive a score of 0 on this exam. All suspicious behavior will be reported to the student misconduct board. In such an instance, you will meet in front of a board of professors to explain your actions.
  DO NOT CHEAT OR DO ANYTHING THAT LOOKS SUSPICIOUS!
  WE WILL REPORT YOU AND YOU MAY BE EXPELLED!
  Keep your eyes down and on your paper. If your TA sees your eyes wandering they will warn you only once before taking your exam from you.

- You have 50 minutes to complete the exam. Use your time wisely: Spend no more than 10 minutes on each page before moving on to the next page.

GOOD LUCK!

1. (12 pts) The graph gives total distance traveled vs time by a moving car, Car A.
   Let $A(t)$ represent the distance traveled by car A in t minutes.
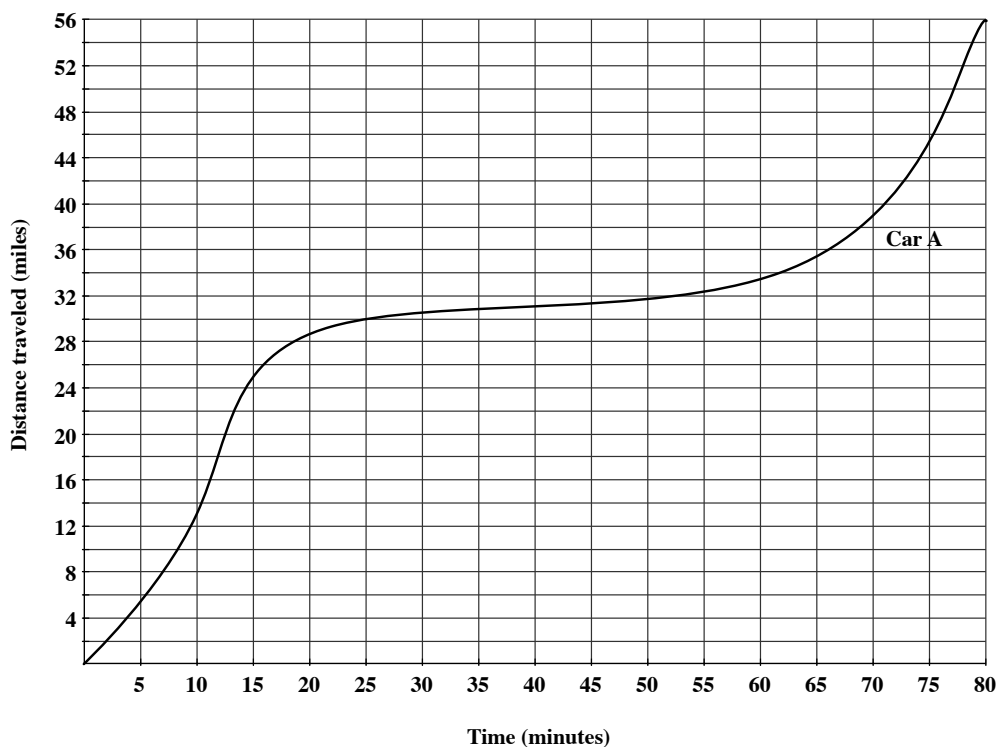
(a) Find a time at which Car A's average trip speed is 0.9 mpm.

$t =$ _____ minutes

(b) Translate the following phrase into functional notation AND compute the value:
   Find the average speed of the car over the 10-minute interval starting at $t = 15$ minutes

FUNCTIONAL NOTATION: _____

"Average speed from 15 to 25" = _____ mpm

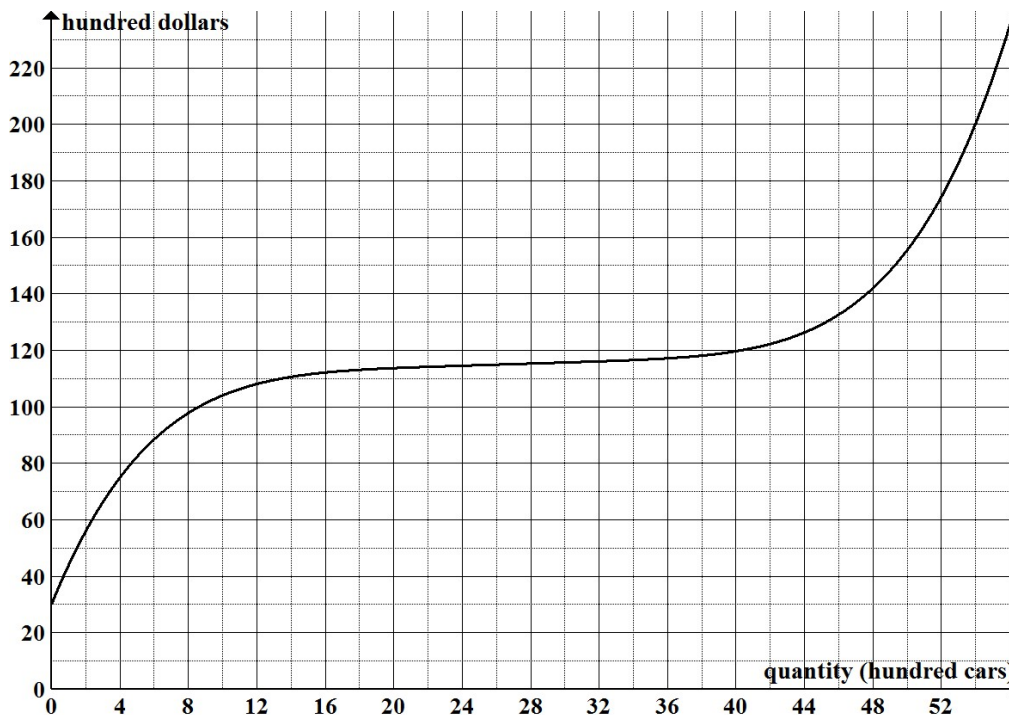(c) Find a value of t such that $A(t) - A(25) = 26$.

$t =$ _____ minutes

(d) As accurately as possible, find the two one-minute intervals over which the car's average
   speed is 0.6 mpm.

One answer: $t =$ _____ to $t =$ _____ minutes

Another answer: $t =$ _____ to $t =$ _____ minutes

2. (15 pts) The graph of **total cost** for producing toy cars are given. The x-axis is given in **hundreds of cars** and the y-axis in **hundreds of dollars**.

(a) As accurately as possible, find the **marginal cost** at 800 cars

$$MC(8) = \underline{\hspace{4cm}} \text{ dollars per car}$$

(b) Find the **average variable cost** at 4000 cars.

$$AVC(40) = \underline{\hspace{4cm}} \text{ dollars per car}$$

(c) The market price is $4.50 per car. Find the maximum profit (include units).

$$\text{Max Profit} = \underline{\hspace{3cm}} \text{ Units} = \underline{\hspace{3cm}}$$

(d) Identify which of the following are true and which are false (clearly circle your answers):

  i. TRUE or FALSE: From $q = 0$ to $q = 20$, $AC(q)$ is increasing.
  ii. TRUE or FALSE: From $q = 40$ to $q = 50$, $MC(q)$ is increasing.
  iii. TRUE or FALSE: The price of 4.50 dollars/car is below the Break Even Price (BEP).

3. ' (8 pts) Your company produces items. To the right are the graphs of **marginal cost**, **average cost**, and **average variable cost** for producing items over the next month for your company. The quantities are in items and MC, AC, and AVC are in dollars per item.
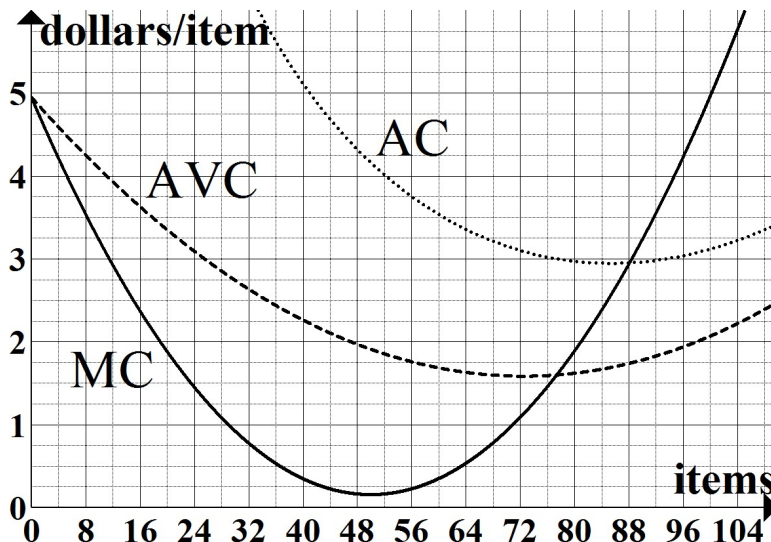
(a) Give the **total cost** at 56 items.

$TC(56) = $ _____ dollars

(b) If the market price for the month is \$1.25 per item should you STAY OPEN or CLOSE? (Briefly explain why. For full points you must make reference to the appropriate concept and graph value.) Explanation:

Circle one: STAY OPEN or CLOSE.

(c) Suppose the market price is \$4.25 per item. Give the longest interval over which profit is increasing.

From $q = $ _____ to $q = $ _____ items

4. . (6 pts) Each dot in the graph to the right gives the **change in profit (in dollars) over the <u>next</u> thing** (also known as marginal profit). For example, the dot at (3,7) means that the profit goes up 7 dollars when you go from selling 3 things to 4 things.
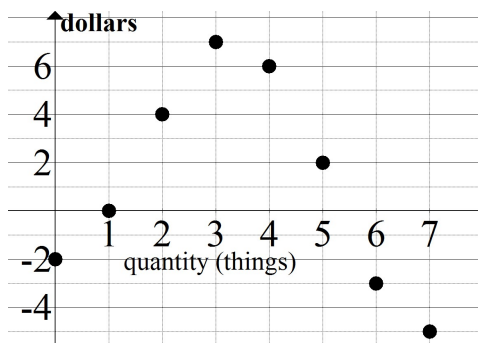
(a) Identify which of the following are true and which are false (clearly circle your answers):

   i. TRUE or FALSE: The profit is higher at $q = 4$ than $q = 5$ things.
   ii. TRUE or FALSE: The profit is higher at $q = 6$ than $q = 7$ things.

(b) If the profit starts at -4 dollars when you sell zero things, then what is the profit if you sell $q = 4$ things?

Profit at $q = 4$ equals _____ dollars

5. (9 points) (Show your work)

   (a) Consider the line $3x + 2y = 36$. Find the x-intercept and y-intercept of the line.

   x-intercept: $(x, y) =$ _____

   y-intercept: $(x, y) =$ _____

   (b) Find the equation of the line that goes through $(1, 14)$ and $(6, 5)$.

   Equation for Line: _____

   (c) For a certain product, the revenue is given by $TR(x) = \dfrac{7x}{2}$ and the total cost is given by $TC(x) = \dfrac{3x + 100}{5}$ where x is in **thousands items**.

   For what values of x will there be a positive profit? (Your answer will be an inequality)
   Round all numbers in your final answer to the nearest item.

   Answer: _____