MATH 111
Exam I
Winter 2015

Name _____

Student ID #_____ Section _____

HONOR STATEMENT

"I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam."

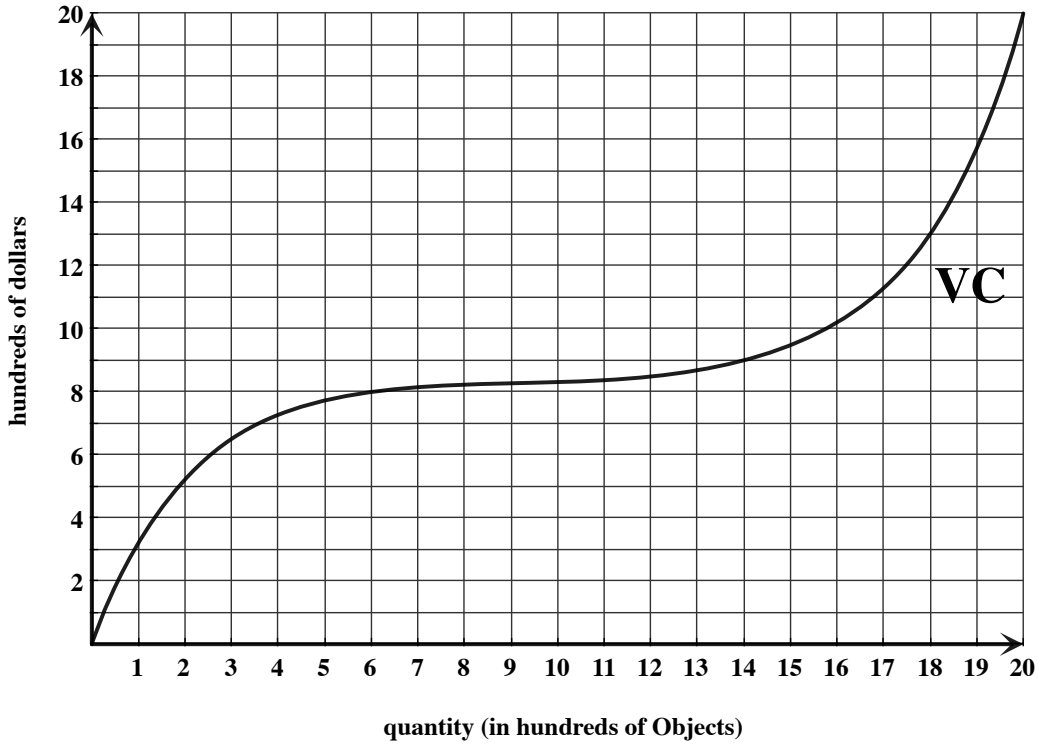
SIGNATURE:_____

1	16	
2	12	
3	12	
4	10	
Total	50	

- Check that your exam contains 4 problems.
- You are allowed to use a scientific (non-graphing) calculator, a ruler, and one sheet of hand-written notes. All other sources are forbidden.
- Do not use scratch paper. If you need more room, use the back of the page and indicate to the grader you have done so.
- Turn your cell phone OFF and put it away for the duration of the exam.
- You may not listen to headphones or earbuds during the exam.
- You must show your work. Clearly label lines and points that you are using and show all calculations. The correct answer with no supporting work may result in no credit.
- If you use a guess-and-check method when an algebraic method is available, you may not receive full credit.
- When rounding is necessary, you may round your final answer to two digits after the decimal.
- There are multiple versions of the exam, you have signed an honor statement, and cheating is a hassle for everyone involved. DO NOT CHEAT.
- Put your name on your sheet of notes and turn it in with the exam.

GOOD LUCK!

1. (16 points) The graph below shows variable cost for producing Objects. (Notice the units on the axes.)



(a) If you are producing 1000 Objects, what is your average variable cost?

ANSWER: _____dollars per Object
(Round your answer to the nearest cent.)

(b) What is the shutdown price?

ANSWER: _____dollars per Object
(Round your answer to the nearest cent.)

(c) Your total revenue (in hundreds of dollars) for selling q hundred Objects is given by the formula $TR(q) = 1.50q$.

i. Sketch and label the graph of TR on the axes above.

ii. If your fixed costs are 7 hundred dollars, what is your profit when you produce and sell 12 hundred Objects?

ANSWER: _____hundred dollars

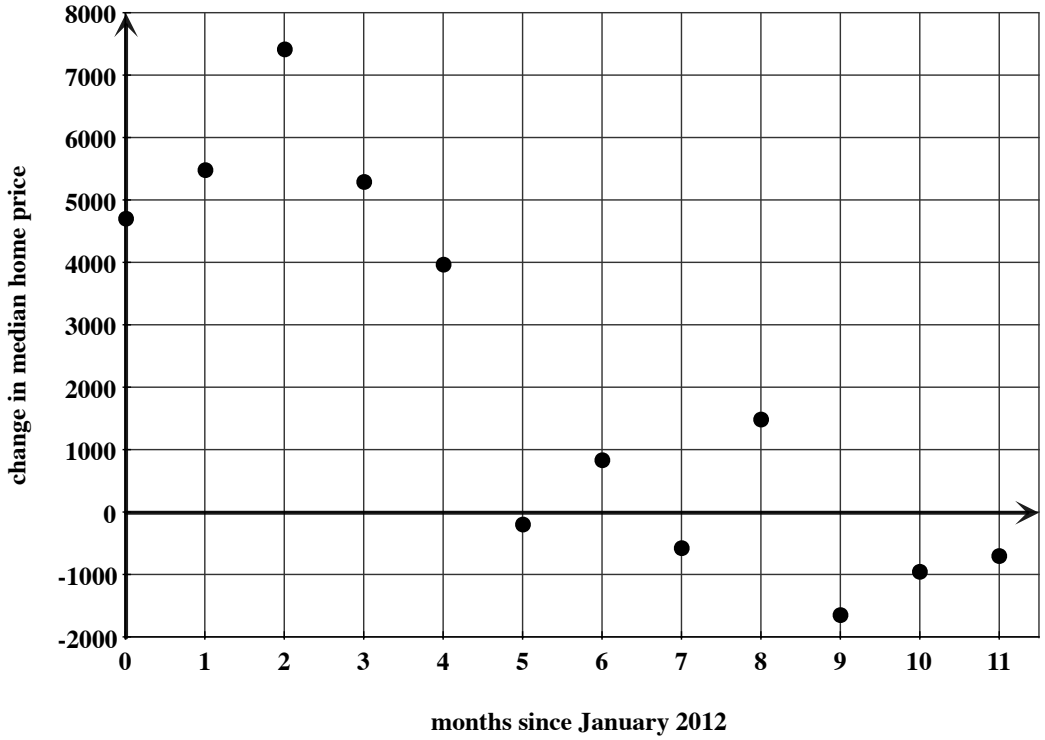
iii. What is the value of marginal revenue?

ANSWER: $\overline{MR}$ =_____dollars per Object

iv. What quantity maximizes profit?

ANSWER: q = _____hundred Objects

2. (12 points) The following graph shows the **change in median home price** in Seattle over each one-month period in 2012. Each dot on the graph shows the change over the **following month**. For example, the height of the dot at $t = 0$ shows that the median home price increased by approximately \$4800 from $t = 0$ to $t = 1$.



(a) For each of the following pairs of times, determine when the median home price was **higher**. If the answer cannot be determined from the available information, circle "cannot determine."

Was the median home price higher:

i. at $t = 2$ or $t = 3$?

ANSWER: (circle one) $t = 2$ $t = 3$ cannot determine

ii. at $t = 9$ or $t = 10$?

ANSWER: (circle one) $t = 9$ $t = 10$ cannot determine

iii. at $t = 11$ or $t = 12$?

ANSWER: (circle one) $t = 11$ $t = 12$ cannot determine

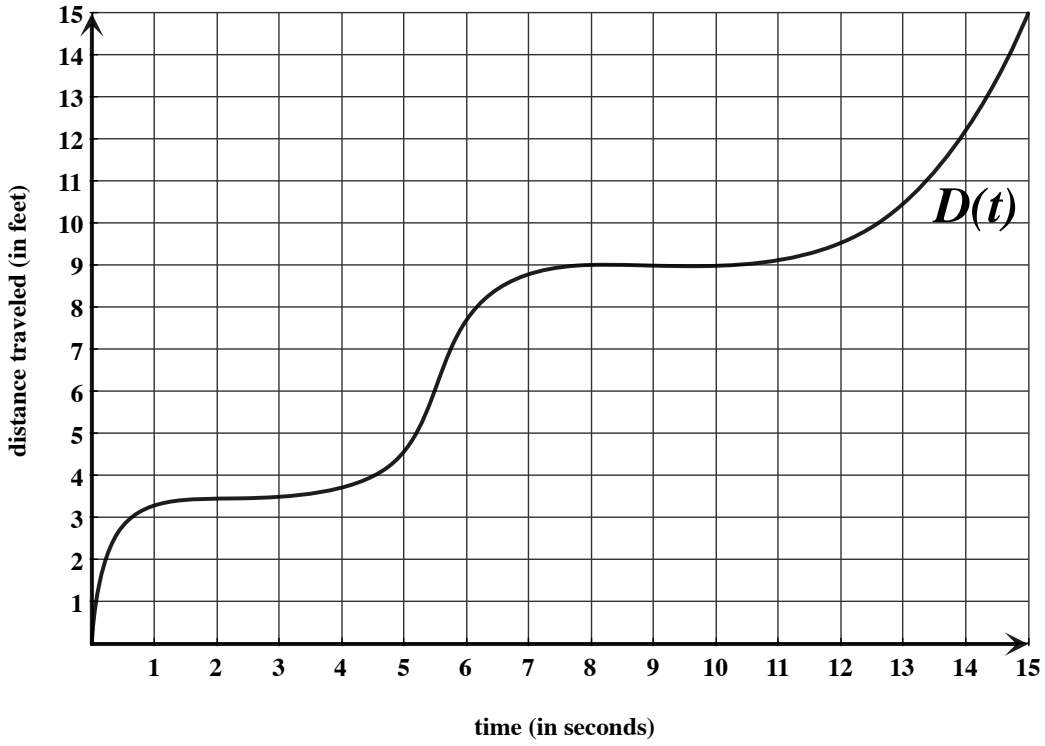
(b) Let $M(t)$ represent the median home price at time t months. Approximate $M(7) - M(5)$.

ANSWER: \$_____

(c) If the median home price at $t = 1$ was \$271,000, what was the median home price at $t = 0$?

ANSWER: \$_____

3. (12 points) The following graph shows distance traveled vs. time for a remote-control car.



Let $D(t)$ represent the car's distance in feet after t seconds.

(a) Translate into functional notation:
"the average speed of the car during the h-minute interval beginning at $t = 6$"

(b) Translate into graphical language: $\dfrac{D(9.25)}{9.25}$

(c) Find all times b **after** $t = 2$ at which $\dfrac{D(b) - D(2)}{b - 2} = 1$.

ANSWER: (list all) $b =$ _____seconds

(d) Find the time **after** $t = 3$ at which average trip speed is **highest**.

ANSWER: $t =$_____seconds

4. (10 points)

   (a) Solve for x:

$$2 + \frac{4x}{3} > \frac{2 - 6x}{3}.$$

   Put a box around your final answer.

   (b) A membership to Atlas Gym costs \$60 per month with no initiation fees. A membership to Bodybuilders Gym costs only \$16 per month but comes with a one-time-only initiation fee of \$209. If you include monthly charges and initiation fees, after how many months does a membership to Bodybuilders Gym become less expensive than a membership to Atlas Gym? (Your answer may not be a whole number of months.)

ANSWER: after _____months