

MATH 111
Exam II
Summer 2013

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	17	
2	17	
3	16	
Total	50	

- Check that your exam contains this cover sheet followed by: 3 problems on 4 pages.
- 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.

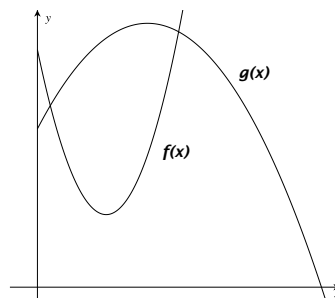
GOOD LUCK!

1. (17 points)

The graphs at right show two functions:

$$f(x) = x^2 - 10x + 36 \text{ and}$$

$$g(x) = -0.25x^2 + 4x + 24.$$



(a) Find the values of x at which the graphs cross.

ANSWER: $x =$ _____ (list all)

(b) What is the largest value of $g(x) - f(x)$?

ANSWER: _____

(c) Find the largest interval on which $f(x)$ and $g(x) - f(x)$ are both increasing.

ANSWER: from $x =$ _____ to $x =$ _____

(THIS PROBLEM CONTINUES ON THE NEXT PAGE.)

- (d) Again, the formula for $f(x)$ is: $f(x) = x^2 - 10x + 36$. Compute and simplify $\frac{f(8+h) - f(8)}{h}$.

Put a box around your final answer.

2. (17 points) You sell Trinkets and you have the following information:

- For an order of q Trinkets, the selling price (in dollars per Trinket) is given by

$$p = -16q + 1000.$$

- Total cost is a **linear** function of quantity q .
- Fixed costs are \$3484.
- The total cost to produce 20 Trinkets is \$4004.

- (a) Find formulas for total revenue and total cost.

ANSWER: $TR(q) =$ _____

$TC(q) =$ _____

(THIS PROBLEM CONTINUES ON THE NEXT PAGE.)

Write your formulas from part (a) again here:

$$TR(q) = \underline{\hspace{10cm}}$$

$$TC(q) = \underline{\hspace{10cm}}$$

- (b) For what quantities is profit exactly \$3000. (Your answers do not need to be whole numbers.)

ANSWER: $q = \underline{\hspace{10cm}}$ (list all)

- (c) What selling price leads to the largest possible profit?

ANSWER: \$ $\underline{\hspace{10cm}}$ per Trinket

- (d) For what quantity is average cost exactly \$243.75 per Trinket?

ANSWER: $q = \underline{\hspace{10cm}}$ Trinkets

3. (16 points) Oscar MacBee sells boxes of toys and balloons for children's parties. The Standard Box contains 30 toys and 60 balloons. The DeLuxe Box contains 75 toys and 90 balloons. Oscar has just done a complete check of his inventory and has found that he has 20,250 toys and 30,900 balloons currently in stock. He earns a profit of \$7 for each Standard Box and \$8 for each DeLuxe Box.

Use the method of linear programming to determine how many of each Box Oscar should sell in order to maximize profit. (You must show all work for full credit.)

ANSWER: _____ Standard Boxes and _____ DeLuxe Boxes