MATH 111
Exam II - Version 1
February 24, 2005

Name _____

Student ID #_____

Section _____

1	19	
2	11	
3	20	
Total	50	

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- Please check that your exam contains three 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. 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.
- 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.

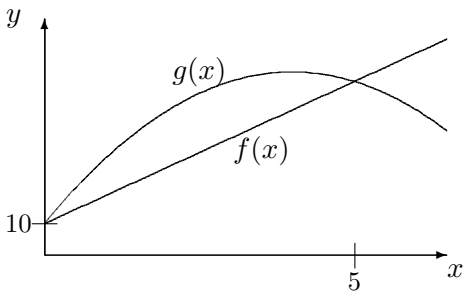
GOOD LUCK!

1. (19 points)

The graphs of two functions $f(x)$ and $g(x)$ are given at right. The formula for $g(x)$ is

$$g(x) = -3x^2 + 24x + 10.$$

The graph of $f(x)$ is a straight line. The graphs of $f(x)$ and $g(x)$ intersect at $x = 0$ and at $x = 5$.



(a) Compute $\dfrac{g(x+2) - g(x)}{2}$. Simplify as much as possible.

ANSWER: $\dfrac{g(x+2) - g(x)}{2} =$_____

(b) For what value of x is $\dfrac{g(x) - g(0)}{x} = 16$?

ANSWER: $x =$_____

(c) Find the linear formula for $f(x)$.

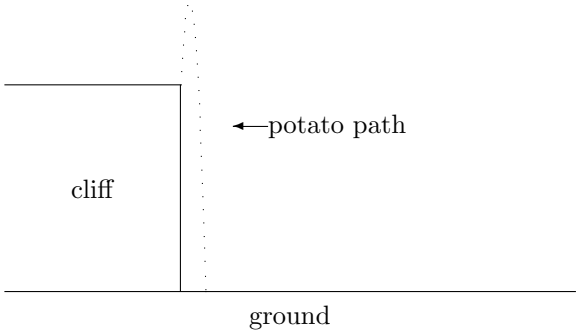
ANSWER: $f(x) =$_____

(d) Give the largest value of x at which the graph of $g(x)$ is 10 units higher than the graph of $f(x)$.

ANSWER: $x =$_____

2. (11 points)

Jorge tosses a potato upward from the edge of a cliff. As the potato comes back down, it falls past Jorge to the ground below. At a time t seconds after Jorge throws it, the potato is $h(t) = -16t^2+48t+103$ feet *above the ground*.



(a) How high is the cliff?

ANSWER: _____feet

(b) How high does the potato go? (i.e. What is its maximum height above the ground?)

ANSWER: _____feet

(c) When does the potato pass Jorge on its way down? (As always, show your work or give a reason for your answer.)

ANSWER: $t =$_____seconds

3. (20 points) You sell Items. You charge $p = 90 - Kq$ dollars per Item for an order of q Items. Your average cost per Item to produce an order of q Items is

$$AC(q) = 0.01q^2 - 1.26q + 52.92 + \frac{1560}{q} \text{ dollars.}$$

(a) On an order of 15 Items, the price per item is \$78.75. Find the value of K.

ANSWER: $K =$_____

(b) Give the longest interval on which total revenue (TR) is increasing.

ANSWER: from $q =$_____ to $q =$_____ Items

(c) What is the value of your fixed cost?

ANSWER: $FC =$_____ dollars

(d) Compute the variable cost for 10 Items.

ANSWER: _____ dollars

(e) Set up the equation that you would solve in order to find all the quantities at which profit is \$1000. Put your equation in the form

$$Aq^3 + Bq^2 + Cq + D = 0, \text{ with } A > 0.$$

DO NOT ATTEMPT TO SOLVE THE EQUATION.

ANSWER: _____