

MATH 111
Exam 2 - Version 2
November 18, 2003

Name _____

Student ID # _____

Section _____

1	17	
2	16	
3	17	
Total	50	

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- Check that your exam contains three problems.
- You must show your work on all problems. The correct answer with no supporting work may result in no credit.
- If you use trial-and-error or a guess-and-check method when an algebraic method is available, you will not receive full credit.
- Write your answers in the specified locations. Unless otherwise indicated, you may 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.
- Any student found engaging in academic misconduct will receive a score of 0 on this exam.
- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (17 points) You manufacture and sell biftoms. The average cost (AC), in dollars, to manufacture and sell q biftoms is

$$AC(q) = 0.01q + 0.8 + \frac{55}{q}.$$

- (a) Find the fixed cost (FC).

ANSWER: $FC = \$$ _____

- (b) Each biftom sells at a market price of \$3.20. If you sell 200 biftoms, what is your profit?

ANSWER: \$_____

(This problem is continued on the back of this page.)

- (c) Recall that $MC(q) = TC(q+1) - TC(q)$. Use this formula to find the marginal cost (MC) at q biftoms.

ANSWER: $MC(q) =$ _____

- (d) Find the breakeven price (BEP).

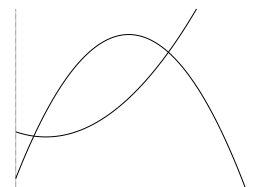
ANSWER: \$ _____

2. (16 points) The functions $f(x)$ and $g(x)$ are quadratic.

Their formulas are

$$f(x) = 0.01x^2 - 0.4x + 44$$

$$g(x) = -0.02x^2 + 3x + 7.5$$



- (a) Find the longest interval of x over which $f(x)$ and $g(x)$ are both increasing.

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

- (b) Find the longest interval of x over which $g(x) > f(x)$.

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

(This problem is continued on the back of this page.)

- (c) Find the value of x in the interval you found in part (b) at which the vertical distance between the two graphs is largest.

ANSWER: $x =$ _____

- (d) A third function $h(x)$ is linear. It intersects the graph of $f(x)$ at $x = 30$ and intersects the graph of $g(x)$ at $x = 50$. Find the formula for the function $h(x)$.

ANSWER: $h(x) =$ _____

3. (17 points) Two bicyclists, A and B, are racing along a straight road. At time $t = 0$, they are side by side on the starting line. The speed of bicyclist A, t seconds later, is

$$S_A(t) = 40 - 0.22t \text{ feet per second.}$$

At time t seconds, bicyclist B is

$$D_B(t) = 35t - 0.075t^2 \text{ feet}$$

from the starting line.

- (a) When will bicyclist B's average trip speed be 22.25 feet per second?

ANSWER: $t =$ _____ seconds

- (b) What is the average speed of bicyclist A over the time interval from $t = 2$ to $t = 5$ seconds?

ANSWER: average speed = _____ feet per second

(This problem is continued on the back of this page.)

- (c) Find a formula for $D_A(t)$, bicyclist A's distance from the starting line after t seconds.

ANSWER: $D_A(t) =$ _____

- (d) The finish line is 3500 feet beyond the bicyclists' location at $t = 0$. Which bicyclist reaches the finish line first (i.e., who wins)?

ANSWER: (circle one) A B