

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 111, Midterm II

February 17, 2011

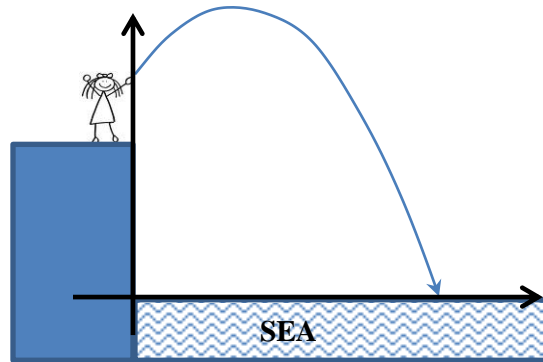
Problem 1	13	
Problem 2	13	
Problem 3	12	
Problem 4	12	
Total:	50	

- This exam is 50 minutes long. You may use a calculator and one double-sided sheet of notes.
- Your exam should contain 4 problems on 4 pages (not including this one). **Check that your test is complete!**
- You must use the methods of this class to solve the problems, and **you must show entirely how you get your answers.** Work done “in your head” cannot get credit. **Work done by guessing and checking, or by reading off values on a graphing calculator will get little or no credit. Correct answers with incomplete, wrong or missing work will get partial credit at best.**
- Write your final answer in the indicated spaces.
- Unless otherwise specified, you may round off your final answer to the nearest two decimal digits. Do not round off before your final answer.
- If you need more room, use the backs of pages and indicate to the reader that you have done so.
- Read each question carefully. Raise your hand if you have a question.

GOOD LUCK!

1. (13 pts) Mary stands on a cliff and throws a rock toward the sea. At t seconds from the moment the rock was thrown, its height $H(t)$ above the sea level is given by the formula:

$$H(t) = -16t^2 + 24t + 15 \text{ (in feet)}$$



- a) (3 pts) How high above the sea level is the rock at the moment when Mary throws it?

ANSWER: _____ feet

- b) (5 pts) What is the greatest height of the rock above the sea level?

ANSWER: _____ feet

- c) (5 pts) Compute the longest time interval during which the rock is at a height of at least 15 feet above the sea level.

ANSWER: from ____ to ____ seconds

2. (13 pts) The **average trip speed** (ATS) of a certain car at t seconds is given by the following function:

$$s(t) = \frac{10}{t} + 60 \text{ feet/sec.}$$

a) (3 pts) Find the formula, in terms of the time t , for the distance function $D(t)$ of this car.

ANSWER: $D(t) =$ _____

b) (4 pts) Compute the average speed of this car over the time interval from 1 to 2.5 seconds.

ANSWER: $AS =$ _____ feet/sec

c) (6 pts) Another car has the following formula for its average trip speed vs. time: $p(t) = 1.5t + 2$ ft/sec. Find the time t when the two cars have **the same average trip speed**.

Answer: At $t =$ _____ seconds.

3. (12 pts) You produce and sell Widgets. Each Widget costs \$7 to produce.
Your Marginal Revenue is a linear function, with $MR(1) = \$8$, and $MR(10) = \$7.19$.

a) Compute the linear formula for the Marginal Revenue function, in terms of the quantity q .

ANSWER: $MR(q) =$ _____

b) What number of Widgets produced and sold results in the maximum profit?

Your answer should be a whole number.

ANSWER: $q =$ _____ Widgets

4. (12 pts) You produce and sell Trinkets. Your total revenue, in dollars, from selling q Trinkets is

$$TR(q) = -2q^2 + 18q.$$

- a) Recall that $MR(q) = TR(q + 1) - TR(q)$. Compute the formula for $MR(q)$ in terms of q . Simplify it as much as possible.

ANSWER: $MR(q) =$ _____ \$/Item

- b) Suppose your variable cost, in dollars, is given by

$$VC(q) = q^3 - 10q^2 + 32q$$

Compute the Shutdown price.

ANSWER: $SDP =$ _____ \$/Item