

MATH 111
Final Exam - Version 1
December 11, 2004

Name _____

Student ID # _____

Section _____

1	20	
2	19	
3	12	
4	21	
5	14	
6	14	
Total	100	

- You are allowed to use a calculator, a ruler, and one sheet of handwritten notes.
- Check that your exam contains six 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.
- Any student found engaging in academic misconduct will receive a score of 0 on this exam.
- You have three hours to complete the exam.

GOOD LUCK!

1. (20 points)

- (a) A diamond necklace appreciates so that its value increases by 1.2% every four years. If you buy the necklace for \$3500, what is it worth eleven years later?

ANSWER: \$_____

- (b) Rebecca borrows \$600 from a friend to buy a drum kit. The friend charges Rebecca simple interest of 2% per year. Rebecca pays her friend back in one lump sum of \$668.64. How long did it take Rebecca to pay back the loan?

ANSWER: _____ years

- (c) Sonny has a bank account with interest compounded continuously. It takes 5.7 years to triple his balance. What is his annual interest rate?

ANSWER: _____%

- (d) Sunny has a bank account with interest compounded monthly. It takes 5.7 years to triple her balance. What is her annual interest rate?

ANSWER: _____%

2. (19 points) Terry and Sherry both have bank accounts. Terry's earns 4% per year, compounded quarterly, and Sherry's earns 6% per year, compounded continuously.

(a) Compute the APY for each account.

ANSWERS: Terry's APY: _____%

Sherry's APY: _____%

(b) How much should Terry deposit in order to have \$4500 after 30 months?

ANSWER: \$_____

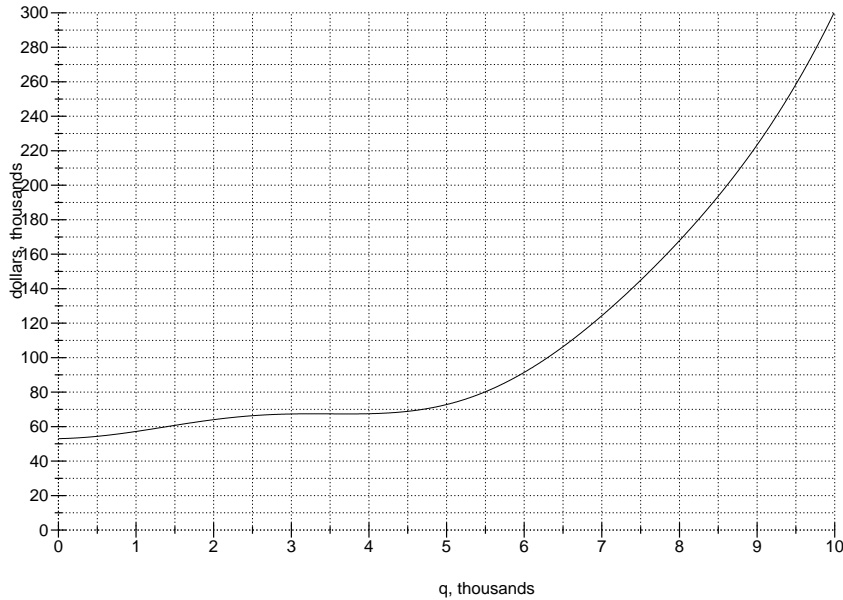
(c) What is the percentage change in Sherry's account over any eight-month period?

ANSWER: _____%

(d) If Terry deposits D dollars in her account, how much must Sherry deposit so they have the same balance after 5 years? (Your answer should depend on D .)

ANSWER: _____dollars

3. (12 points) You sell Chumbos. The graph of total cost, in thousands of dollars, for selling q thousand Chumbos is given below.



- (a) If Chumbos sell for \$20.00 each, what is the largest quantity at which you break even (i.e. profit=0)?

$q =$ _____ thousand Chumbos

- (b) Compute the average variable cost if you produce nine thousand Chumbos.

$AVC =$ _____ dollars per Chumbo

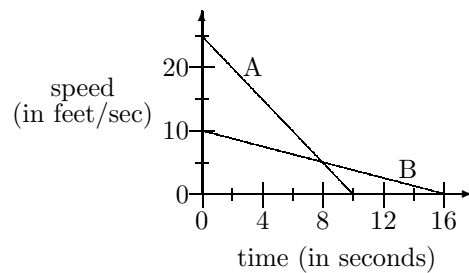
- (c) Compute the break even price.

\$ _____

- (d) Name a quantity at which average cost (AC) is \$35 per Chumbo.

$q =$ _____ thousand Chumbos

4. (21 points) Two toy cars are traveling next to one another along a racetrack. They both pass the start at time $t = 0$. The graphs to the right are of the speed versus time for the cars. Recall that, if a car has linear speed formula $s = mt + b$, then its distance formula is $d = \frac{m}{2}t^2 + bt$.



- (a) Find the distance formulas for the two cars: $D_A(t)$ and $D_B(t)$.

ANSWERS: $D_A(t) =$ _____

$D_B(t) =$ _____

- (b) At what time in the first 10 seconds are the two cars furthest apart?

ANSWER: $t =$ _____ seconds

- (c) When is car A exactly 42 feet ahead of car B for the first time?

ANSWER: _____ seconds

- (d) When is car A 's average trip speed 16 feet per second?

ANSWER: _____ seconds

5. (14 points) You manufacture and sell rigfins. You sell them at a constant market price of p dollars. Your marginal cost is a constant \$3.00.

If you sell 100 rigfins, your profit will be \$30. If you sell 250 rigfins, your profit will be \$330.

- (a) Profit is a linear function of quantity q . What quantity must you sell to earn a profit of \$1000?

ANSWER: $q =$ _____ rigfins

- (b) Compute the value of p , your market price, and FC , your fixed cost.

ANSWERS: $p = \$$ _____, $FC = \$$ _____

- (c) Find the quantity at which your average cost (AC) is \$4.59 per rigfin. (Round to the nearest whole rigfin.)

ANSWER: $q =$ _____ rigfins

6. (14 points) You sell Forrubs. The following chart gives the values of marginal revenue and marginal cost for selling various quantities of Forrubs.

q (in Forrubs)	0	1	2	3	4	5	6	7	8	9	10
MR (in dollars)	100	111	120	127	132	135	136	135	132	127	120
MC (in dollars)	31	50	67	82	95	106	115	122	127	130	131

- (a) What is your total revenue for selling 3 Forrubs?

ANSWER: $TR(3) =$ _____ dollars

- (b) What whole number quantity of Forrubs will give you the maximum profit?

ANSWER: $q =$ _____ Forrubs

- (c) How does profit change if quantity is increased from $q = 3$ to $q = 4$ Forrubs?

ANSWER: Profit (circle one) increases decreases by \$_____.

- (d) You also sell Mustiks. The variable cost (VC) for selling Mustiks is

$$VC(q) = 0.001q^3 - 1.59q^2 + 845.7q.$$

What is the shut down price?

ANSWER: \$_____