EQUATIONS YOU MAY NEED FOR THIS EXAM

Depreciation = (Purchase price - salvage value) / years of useful life

Average Value = (Purchase price + salvage value) / 2

Slope = change in Y / change in X or change in P / change in Q_d

Percent change in $Q_d = [(Q_1 - Q_0) / Q_0] \times 100$
Percent change in $P = [(P_1 - P_0) / P_0] \times 100$

Marginal revenue = change in total revenue / change in control variable
Marginal cost = change in total cost / change in control variable

EXPLANATION OF TERMINOLOGY USED

Graph = accurately scaled, precisely plotted, accurately drawn to scale, and labeled.

Rough sketch or illustrate = not scaled or precisely plotted, but completely labeled.

Exam #2
ARE 012, Fall 1994

Answer the five (5) questions below. Do all parts of each question. Use a separate sheet of paper to answer each number questions, and arrange your answers in numerical order when finished with the exam. Write the number of each question and your name on the top of each sheet of paper you use. You must show all work to receive full credit. The price of all parts of each question is provided so that you may make an informed management decision regarding the production of this exam. **DO NOT** write answers on the test sheets except for the table in Question #5. Be thorough and complete in ALL your responses. **RETURN THE TEST SHEET !!!** No test sheet: F for the exam.

Please read and sign the Honor Pledge that follows:

I have neither given or received unauthorized aid on this exam.

_____

Student's Signature

1. You have just purchased a new half ton pickup truck for $14,522 including all sales taxes. You expect to drive the truck 15,000 miles each year. You plan to drive the truck 8 years then sell it for $3,661. Auto insurance will cost you $500 per year for liability. Collision with $500 deductible, and comprehensive with no deductible will cost you $20 per $1,000 of coverage. The property tax rate in your city and county is $1.00 per $100 of value. You paid cash for your new truck, but you had to withdraw the money from your money market account currently paying 4.5 percent interest. Tags will cost you $26.50 per year. Annual inspections will cost you $19.50 per year. **(Organize and neatly SHOW ALL WORK and answers)**

For this truck, please calculate or record the following annual ownership costs:

Depreciation, Interest, Property taxes, Insurance (This one is tricky so here is a hint: $500 liability + the usual insurance calculation), Tags, Inspection fee, and Total Annual Ownership Cost. **(10 points)**

a. Total annual operating cost for this vehicle (gas, oil and grease, tires, general maintenance) is $1,075 per year. Please calculate total ownership and operating cost per **MILE**. **(10 points)**

2. In 1973, I was 16 years old and the price of a gallon of regular gasoline was $.48. Today, I can purchase a gallon of regular gasoline for $1.05. Inflation over this time period was 225 percent. Calculate the percentage change in the price of gasoline from 1973 to 1994. **SHOW ALL OF YOUR WORK !!!**

a. What has happened to the "real" price of gasoline since 1973 ? **(5 points)**

b. In 1973, I regularly worked for $.75 per hour cash (off the books). How many hours did I have to work to buy one gallon of gasoline at the $.48 price? **(5 points)**

c. Assume you can earn $6.00 per hour cash (off the books) today. How many hours must you work to buy a gallon of gasoline at today's price of $1.05? **(5 points)**

d. How many more hours did I have to work in order to earn enough money to buy a gallon of gasoline?

Is gas less expensive today (relative to my youthful days) as measured by hours of work? **(5 points)**

3. Accurately **graph** the following demand schedule for 7 to 8 ft. Red Sunset maple trees for the Three Stooges Garden Center during the Fall planting season. (**GRAPH TO SCALE AND LABEL.**) **(10 points)**

Price	Quantity demanded per month
$36	5
28	25
24	35
20	45
12	65
8	75

a. Calculate the slope of this demand curve. **SHOW THE EQUATION AND ALL OF YOUR WORK !!!! (8 points)**

b. What type of relationship between price and quantity demanded is illustrated here ? **(2 points)**

4. Given the production possibilities schedule below, what is the opportunity cost of increasing the value of Ag. Commodities from $ 0 to $ 500 Billion ? (Below, B=billion) **(5 points)**

$value of Ag. Commodities	$ 0B	100B	200B	300B	400B	500B
$value of Non-Ag. Commodities	$ 480B	456B	384B	288B	168B	24B

a. Calculate the opportunity cost of increasing the value of Ag. Commodities **(5 points)**

From $0 to $100B ?
From $100B to $200B?
From $200B to $300B?
From $300B to $400B?
From $400B to $500B?

b. What economic law do your answers in (a) above demonstrate? **(5 points)**

c. Explain the basic reason why the economic law you identified in (b) above exists as we move along a downward sloping, bowed out production possibilities curve. **(5 points)**

5. **TO SAVE TIME, YOU MAY FILL IN THE TABLE BELOW.**

You are going into the shotgun shell reloading business. You are trying to determine how many employees to hire to work the loading machine at a wage rate of $6.00 per hour. Therefore, the control variable is the number of employees. Components (shell casing, primer, wads, shot, and powder) will cost $2.00 per box. There are no fixed costs (overhead). You can sell every box of shells you reload for $4.00 per box. You get five friends to come over just before dove season to load some shells, and help you with some economic research. After some initial training on the reloading machine, you first let one friend reload for an hour, and count the number of shells loaded. Then you let two friends reload for an hour, and so on until all five friends are working at the reloading machine, each having a specific task to perform. The results are on the next page.

Employees	Change in Quantity of Control Variable	Boxes loaded per hour	Total Revenue	Marginal Revenue	Total Cost	Marginal Cost
1		15	_____		$ 36	
	_____			_____		_____
2		35	_____		$ 82	
	_____			_____		_____
3		51	_____		$120	
	_____			_____		_____
4		55	_____		$134	
	_____			_____		_____
5		57	_____		$144	

You must have correct answers in the table above to get credit for a,b, and c below! In other words, guessing won't cut it.

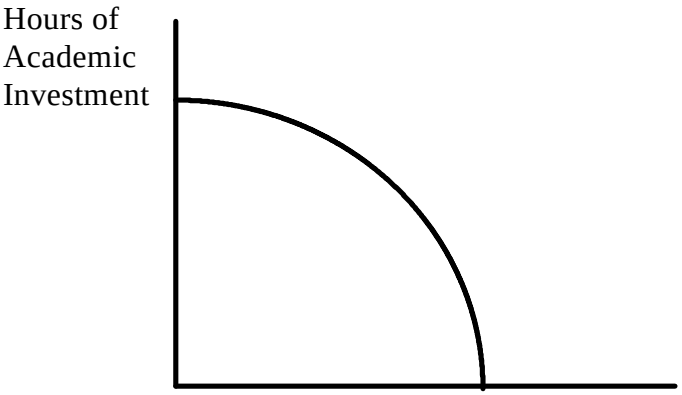
a. Using marginal analysis, how many employees should you hire to maximize profits ? **(10 points)**

b. Suppose you hire the profit maximizing number of employees, and begin production. A high school student from down the road comes to you and asks for a job after school. He/she is a fine young person and you want to help him/her out. What is the maximum wage rate per hour you could pay this student, and not diminish your profits from the current level ? (This is tricky, THINK!) **(5 points)**

c. Aside from the fact that you will feel good because you are helping a young person out, why else would hiring this young person be of any benefit to you ? (This is tricky too, so THINK !) **(5 points)**

BONUS QUESTIONS:

1. Illustrated below is a student's PPC for Hours of Leisure and Hours of Academic Investment. Provide an illustration of a PPC for the $ value of Basic Wants and $ value of All Other Wants on your answer sheet. If the student were to allocate his/her time resources at <u>POINT A</u> of the PPC, what probable affect will the hours of leisure and academic investment at this point have on the long run economic growth of this student ?
(10 points)



2. Lately, American and Japanese made automobiles have been getting bigger, with more powerful, higher performance engines. Consumers have not been as concerned with the fuel efficiency (aka: physical efficiency) of their autos lately either. Why has this occurred?

Before you answer, figure out what happened to the economic efficiency of an automobile getting 15 miles per gallon between 1973 and 1994 as a result of the change in the real price of gasoline? **(10 points)**

On your answer sheet, set up two equations for economic efficiency as follows:

$$\text{E.E. 1973} = \frac{\text{15 miles}}{\text{1 gallon gas}} \times \frac{\text{\$1.00 per mile}}{\text{price of gas in 1973}}$$

$$\text{E.E. 1994} = \frac{\text{15 miles}}{\text{1 gallon gas}} \times \frac{\text{\$1.00 per mile}}{\text{What did the } \textbf{real} \text{ price of gas do from 1973 to 1994?}}$$

Now answer the question I have asked.