

## **EQUATIONS YOU MAY NEED FOR THIS EXAM**

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

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

Slope = change in Y / change in X, or change in P / change in Q, or RISE / RUN

Percent change = [(To - From) / From] \* 100

Percent change in  $Q_d = [(Q_1 - Q_0) / Q_0] * 100$

Percent change in P =  $[(P_1 - P_0) / P_0] * 100$

Marginal revenue = change in total revenue / change in Quantity of control variable

Marginal cost = change in total cost / change in Quantity of control variable

Physical Efficiency = Units of Output / Units of Input

Economic Efficiency = Value of Output / Value of Input

= (Units of Output \* Price of Output) / (Units of Input \* Price of Input)

= PE \* (Price of Output / Price of Input)

Change in Economic Efficiency = Change in the value of output / Change in the value of input

Average Relative Price<sub>i</sub> in 1982-84 dollars = (Nominal Price<sub>i</sub>/CPI<sub>i</sub>) X 100 Where i = year

## **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.

What "explain" means on one of my exams:

Webster's Collegiate Dictionary defines EXPLAIN as:

1. to make plain or understandable
2. to give the reason of or cause of
3. to show the logical development or relationships of

Webster's continues by enhancing the definition with the following statement:

"Explain implies a making plain or intelligible what is not immediately obvious or entirely known."

**SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED MANNER**

## Exam 2 ARE 012, Spring 1998

Answer the questions below to the best of your ability. Answer the questions on the test sheet. Answer all parts of each numbered question. **You must show all work to receive full credit for your answers to numerical problems.** The price associated with all parts of each question (input) is provided so that you may make an informed management decision regarding the production of this exam (output). Be thorough and complete in ALL your responses. Please read and sign the Honor Pledge on the test sheet below or your exam will not be graded:

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

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Student Name (print please)

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Student's Signature

Circle the correct response for each multiple choice question below. Each multiple choice question has an opportunity cost of **2 points**.

1. What were the **KEY** words in the definition of economics as presented in class:

- a) demand and supply
- b) normative and positive
- c) profit and losses
- d) choices, scarcity, and time
- e) none of the above

2. Goods are scarce because:

- a) they are imported from other countries
- b) they sometimes have to be ordered
- c) a person can never acquire "enough" goods and services at a price equal to zero
- d) it takes time to produce goods
- e) none of the above

3. One of the functions of an economic system is to Provide for the Maintenance and Growth of the System. An example of this function is as follows:

- a) Anti-Trust laws to prevent monopolies from taking advantage of consumers
- b) using prices to ration consumption
- c) assembling the factors of production to produce a good or service
- d) a government tax break on capital investments
- e) none of the above

4. Consumer sovereignty refers to the following function of an economic system:

- a) determining what commodities to produce and how much to produce
- b) organizing the production process
- c) providing for the maintenance and growth of the system
- d) distributing resources, commodities, and proceeds from production
- e) none of the above

5. Let's suppose that you have a job that pays \$25,000 per year in your hometown of Spivey's Corner, North Carolina. You are offered a job in Denver, Colorado that pays \$40,000. What is your opportunity cost of working in Spivey's Corner?

- a) \$ 5,000
- b) \$15,000
- c) \$25,000
- d) \$40,000
- e) insufficient information to work problem

6. In the table below, you see a list of inputs in the left-hand column. Fill in the factor of production category that is associated with the input in the column labeled "Factor of Production". Fill in the name of the payment that the factor of production receives in the column labeled "Payment Received". **(10 points)**

<b>Input</b>	<b>Factor of Production</b>	<b>Payment Received</b>
Screwdriver		
Air compressor		
Industrial diamonds		
Computer		
A 12 point, 26 inch inside spread buck (deer)		
Innovative ability		
Physical work		
Education		
Farm Truck		
Walk Behind Mower		

7. Jeff Buckshot's gross income in 1997 was \$25,000. His wife Ellen grossed \$45,000 in 1997. Jeff and Ellen have three children ages 2, 4, and 6 years of age.

The standard deduction for a married couple jointly filing a 1997 Federal Tax Return is \$6,900. Jeff and Ellen have itemized deductions that total \$5,000. The personal and dependent exemption is \$2,650 each. The combined Social Security and Medicare tax rate is 7.65%.

The tax on Jeff and Ellen's personal property that is paid to their county government and local municipality totals \$1,200. Jeff and Ellen purchased 1,500 gallons of gas for their vehicles in 1997. The combined federal and state excise tax rate on gasoline in North Carolina is \$.404 per gallon. Jeff and Ellen incurred \$2,800 of sales taxes during the year.

They spend about 45% of their gross income on family living expenses (mortgage payment, food, clothing, car payments, utilities).

a. Calculate Jeff and Ellen's **taxable income** for 1997. **(2 points)**

b. Calculate Jeff and Ellen's **disposable income** for 1997. **(2 points)**

c. Calculate Jeff and Ellen's **discretionary income** for 1997. **(2 points)**

8. List the functions of an economic system that must be performed. **(5 points)**

- a.
- b.
- c.
- d.
- e.

9. You own a landscape maintenance business with five maintenance crews serving a segment of the North Raleigh residential market. Over the last five years, you have calculated that the wage rate you must pay to hold on to your current labor force has increased 33%. You are having difficulty passing this higher labor cost on to your customers because of stiff competition in the area. The CPI index (1982-84 =100) in 1992 was 141.9. The CPI index at the end of 1997 was 161.3. Calculate the inflation rate and determine what has happened to the real price of labor? **(5 points)**

- a. As a profit maximizing manager, discuss what you would consider to reduce your labor cost, increase profits, and maintain customer service at current levels. **(5 points)**

10. Let's suppose a friend of yours manufactures and sells climbing deer stands. Your friend has asked you to help him sell his deer stands at the Dixie Deer Classic in Raleigh. The Deer Classic will run from 5:00 p.m. to 9:00 p.m. Friday, 9:00 a.m. to 9:00 p.m. on Saturday, and 9:00 a.m. to 5:00 p.m. on Sunday. You would get a 1 hour break on Saturday and Sunday. Assume your current wage rate is \$20.00 per hour. You value your free time during this period of the year at 60% of your wage rate. Your friend will compensate you for all your direct costs (e.g. transportation).

In return for your time, your friend has offered you two free deer stands valued at \$225 each.

a. What is the value of your free time that you give up by working at the Deer Classic? **(2 points)**

b. Will you help your friend at the Deer Classic? Explain your answer. **(8 points)**

11. 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 \$.99. The CPI index (1982-84) in 1973 was 44.4, and in February of 1998 it was 161.9. **SHOW ALL OF YOUR WORK !!!**

a. First calculate the percentage change in the CPI index from 1973 to February 1998. Then calculate the percentage change in the nominal price of gasoline from 1973 to February 1998. What has happened to the "real" price of gasoline since 1973? **(2 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 nominal price \$.48 per gallon? (2 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 nominal price of \$.99? (2 points)

d. Write down the hours I had to work to buy 1 gallon of gas in 1973. Again, assume you are earning \$6.00 per hour cash (off the books). If you had to work the same number of hours to buy a gallon of gasoline as I did, what would today's nominal price of gasoline per gallon have to be? (4 points)

12. The data below are derived from feed trials with broilers (chickens). Physical efficiency is the pounds gained per pound of feed consumed as the birds age from one week to the next. For example, the physical efficiency is .75 as we feed the birds from week 1 to week 2; .65 as we feed the birds from week 2 to week 3. As the birds age, they become less efficient in converting feed to edible meat.

<b>WEEK</b>	<b>PHYSICAL EFFICIENCY</b> (Pounds gained per pound of feed consumed)	<b>ECONOMIC EFFICIENCY</b> Price of Broiler = \$.25 per pound Price of Feed = \$.10 per pound
<b>1</b>	-----	-----
<b>2</b>	<b>0.75</b>	
<b>3</b>	<b>0.65</b>	
<b>4</b>	<b>0.61</b>	
<b>5</b>	<b>0.57</b>	
<b>6</b>	<b>0.49</b>	
<b>7</b>	<b>0.41</b>	
<b>8</b>	<b>0.39</b>	
<b>9</b>	<b>0.35</b>	

a. Compute the ECONOMIC EFFICIENCY of feed when broiler price is \$.25 per pound and feed costs are \$.10 per pound, for the weeks indicated and record in the table above. **(5 points)**

b. How many weeks should the broilers be fed in order to maximize profits with respect to feed? No guessing! You must calculate the Economic Efficiency correctly in the table above in order to get credit for this question. **(5 points)**

13. You have just purchased a new half-ton, extended cab pickup truck for \$23,000 including all taxes, destination and delivery charges. You expect to drive the truck 15,000 miles each year. You plan to drive the truck 5 years, then sell it for \$11,000. Auto insurance will cost you \$750 per year for liability insurance, **PLUS** \$24 per \$1,000 of coverage for collision and comprehensive insurance. The property tax rate in your city and county totals \$1.20 per \$100 of value. You paid cash for your new truck from savings in your money market account that was earning 3.25 percent interest. Tags will run you \$26.50 per year. Annual inspection in your county will run \$19.50 per year.

a. Please calculate the annual ownership costs for the truck below (**Show Your Work and all units**) (10 points):

Depreciation:

Interest:

Property taxes:

Insurance:

Tags:

Inspection Fee:

Total Annual Ownership Cost:

b. Total annual operating cost for this vehicle (gas, oil and grease, tires, and general maintenance) is \$1,750 per year. Please calculate total ownership and operating cost **per MILE**. (10 points)

14. You have just purchased a four-row cotton picker for \$195,000. The salvage value of the cotton picker is \$40,000. The useful life of the cotton picker is 10 years. You borrowed money to purchase the cotton picker at 9 percent. The insurance rate on the cotton picker is \$10.00 per \$1,000 of value. The property tax rate is \$.65 per \$100 of value.

You plan to use the cotton picker 200 hours per year. The cost of fuel, oil, repairs and maintenance is \$60.00 per hour of operation. You will pay a worker \$10.00 per hour to operate the cotton picker.

The average performance rate of the picker is .295 hours per acre.

a. What is the estimated ownership and operating cost of the cotton picker per hour? Organize your work in a neat and orderly fashion. Label all numbers with their respective units. I am not going to hunt for answers. **(5 points)**

b. What is the estimated ownership and operating cost of the cotton picker per acre? Organize your work in a neat and orderly fashion. Label all numbers with their respective units. I am not going to hunt for answers. **(5 points)**

**Bonus Questions:**

1. 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. Components (shell casing, primer, wads, shot, and powder) will cost \$3.00 per box. There are no fixed costs (overhead). You can sell every box of shells you reload for \$5.00 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 below.

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

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

- Using marginal analysis, how many employees should you hire to maximize profits? **(5 points)**
- 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)**

2. Accurately **graph** the following supply schedule for 7 to 8 ft. Crimson King Maple trees for the Three Stooges Garden Center during the Fall planting season. Construct your graph in the open space below. (**ACCURATELY GRAPH TO SCALE AND LABEL.**) (10 points)

<u>Price</u>	<u>Quantity demanded per month</u>
\$60	160
44	120
36	100
28	80
12	40
4	20

3. Pee Wee Herman, a native of rural Warren County, N.C., is about to graduate from the famous Agricultural Institute with an Agribusiness Management Degree. Pee Wee has been offered a job with Archer, Daniels and Midland Corp. in Decatur, Illinois at a salary of \$28,000 per year. Carolina Biological Supply Co., located about 10 miles from Pee Wee's home place, has offered him a job at a salary of \$18,000 per year. The cost of living in both locations is nearly identical. The benefit package offered by each company is the same. Pee Wee has a beautiful girlfriend in all respects attending Louisburg College. She is also from Warren County and will graduate next year. They have discussed getting married. Pee Wee loves to deer hunt, and he has 15 Walkers that are the envy of every dog hunter in the county. Warren County has a large deer herd, and it is legal to hunt deer with dogs. Hunting with dogs in Illinois is illegal. All of Pee Wee's family lives in Warren County. All of his girlfriend's family lives in Warren County. Using the concepts of opportunity cost and the "emotional overcoat", discuss how Pee Wee should evaluate his alternatives and make a decision. **(10 points)**