First Quiz
Managerial Economics: Eco 685
Friday, February 4, 2005

The test is closed notes and goes until 9:15. Good luck!

$$pv = \sum_{t=1}^{n} \frac{\pi_t}{(1+i)^t}, \quad \pi_t = TR_t - TC_t$$

$$\text{Economic Profits } = \text{accounting profit } - \text{ return on capital used} - \text{ owner's labor}$$

$$\frac{\partial bL^c}{\partial L} = bcL^{c-1}, \quad \frac{\partial a + bL^c}{\partial K} = 0, \quad \frac{\partial \text{ objective}}{\partial \text{ decisions}} = 0 \text{ at the maximum}$$

$$MRP = \frac{\partial TR}{\partial \text{input}} = MR \cdot MP, \quad ME = \frac{\partial TC}{\partial \text{input}}, \quad MR = \frac{\partial TR}{\partial Q}$$

$$MRP = \frac{\Delta TR}{\Delta \text{input}}, \quad MP = \frac{\Delta TR}{\Delta \text{input}}$$

$$MP = \frac{\partial Q}{\partial \text{input}}, \quad \frac{MP_K}{MP_L} = \frac{P_k}{P_L}$$

$$TC = TFC + TVC, \quad ATC = \frac{TC}{Q}, \quad AFC = \frac{TFC}{Q}$$

$$AVC = \frac{TVC}{Q}, \quad MC = \frac{\partial TC}{\partial Q}, \quad Q_{\text{break even}} = \frac{TFC}{P - AVC}$$

Short Answer (1-3 sentences!)

Question 1 (10 points)

Give two reasons why in general maximizing profits benefits society.

Question 2 (10 points)

Suppose the ratio of marginal products is greater than the price ratio:

$$\frac{MP_s}{MP_u} > \frac{P_s}{P_u} \tag{1}$$

Here s is skilled labor and u is unskilled labor. Give one strategy to increase profits.

Question 3 (5 points)

Explain why the marginal product of labor tends to diminish, holding other inputs fixed.

Question 4 (10 points)

In Peru the median firm size is one employee.

a. Are Long Run Average Costs likely increasing, decreasing, or constant?

b. Give one likely reason why.

Question 5 (5 points)

A firm paid \$500,000 for an option to buy a building for \$5,000,000. The total cost if it buys is \$5,500,000. The firm finds an alternative building for \$5,250,000. Which should it buy?

Problems

Question 6 (20 points)

Broiler chickens are sold for \$3 per pound. A regression analysis done by the OECD in 1966 determined that the weight in pounds, Q, is determined by the pounds of corn, C, and soybean oilmeal, S, the chickens eat. The production function is thus:

$$Q = 0.03 + 0.48C + 0.64S - 0.02C^2 - 0.05S^2 \tag{2}$$

The price of corn is \$0.40 per pound and the price of soybean oilmeal is \$0.30 per pound.

a. Calculate the amount of corn and soybean oilmeal that maximize profits.

b. Calculate the maximum profits.

c. Calculate the quantity of corn and soybean which maximize production.

Question 7 (20 points)

Enterprise Corporation makes speedboats. Their annual costs are:

$$TC = \frac{1}{2}Q^2 + 20Q + 150 \tag{3}$$

Here Q is the number of speedboats. Assume the market for speedboats is competitive, so that Enterprise can sell any number of speedboats for a price of \$50. The \$150 in the total costs corresponds to maintenance costs on a warehouse, that Enterprise has already paid.

a. Calculate how many speedboats Enterprise should make to maximize profits.

b. Calculate the profits of Enterprise Corp.

c. Suppose Enterprise can sell the warehouse for \$500 and close operations. Should Enterprise do so?

Question 8 (20 points)

Econ students (S) and coffee (C) are inputs to the production of economics homework solution sets (Q). The production function is:

$$Q = C \cdot S \tag{4}$$

Suppose the price of coffee is \$3 and econ students earn a wage of \$9.

a. Explain how coffee affects the additional production that results from a small increase in the number of econ students.

b. Compute the optimal ratio of coffee per student (ie. how many cups of coffee should each student consume?).

c. Suppose the operation has a budget of \$36. Compute the optimal amount of coffee, students, and solutions sets.