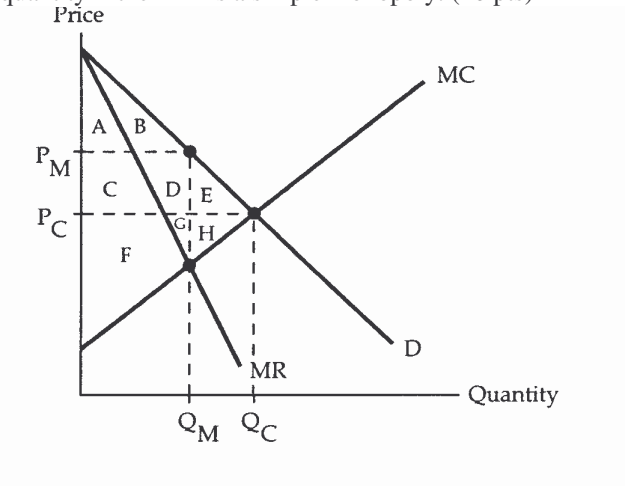
ECON 310
Assignment #4
Due: Wednesday, November 7 at 9:00 a.m.
Please write your answers on a separate piece of paper and show all of your work.
Please write legibly!

1. A firm has the production function $Q = L^{2/3}K^{1/3}$. Using calculus, the $MPL = 2/3\ L^{-1/3}K^{1/3}$, and the $MPK = 1/3L^{2/3}K^{-2/3}$. The wage rate is $4 per hour and the rental rate is $2 per hour. The firm decides to spend $60 on its inputs. (10 pts)

Equation 1: MPL/MPK = Pl/Pk = 2K/L = 4/2 = 2K=2L = K=L
Equation 2: 4L + 2K = 60
Sub (1) into (2) to get 4K + 2K = 60
6K=60 = K=10, L=10

i. What is the optimal level of K? *10*
ii. What is the optimal level of L? *10*
iii. What is the firm's total level of production (Q)? *Q = 10^(2/3) * 10^(1/3) = 10^1 = 10*
iv. Graph the entire situation. Label both curves, including endpoints, and indicate the optimal bundle.
Intercepts: K-axis (0,30); L-axis (15,0); optimal bundle= (10,10)
v. Does this production function $Q = L^{2/3}K^{1/3}$ exhibit <u>increasing</u>, <u>decreasing</u>, or ***<u>constant</u>*** returns to scale?

2. P_C and Q_C are the equilibrium price and quantity if the firm behaves competitively, and P_M and Q_M are the equilibrium price and quantity if the firm is a simple monopoly. (10 pts)



i. What area represents the producer's surplus earned in the monopoly equilibrium? *_CDFG____*

ii. Suppose this firm initially acted competitively. If the firm switched to the simple monopoly equilibrium, how much deadweight loss would be created? *_EH____*

iii. The difference between producer's surplus as a simple monopolist and producer's surplus if the price was set at the competitive equilibrium is: *__CDFG-FGH= CD-H____*

iv. Suppose the firm could perfectly price discriminate. The difference between consumer surplus under a simple monopoly scenario and consumer's surplus under the perfect price discriminating monopoly scenario is: *__AB – 0 = AB_____*

iv. Suppose the firm could sell some of its product in a different city for the competitive market price. Should the firm sell more or less that Qm in its local market? Label the new quantity Qn on the graph above. ***Less, Qn should be where MR=MC city (Pc)***

3. Chapter 12, Problem Set # 1-5. **NOTE: Only Do Game Matrices IV-VIII.** (25 pts)

IV. 1. Nash: (right, down)
2. PO: (right, up), (right, down) & (left, down)
3. Dom Jack/Jill: yes (right)/yes (down)
4. Jack first: (right, down)
5. Jill first: (right, down)

V. 1. Nash: none
2. PO: (Left, down) & (right, down)
3. Dom Jack/Jill: no/no
4. Jack first: (right, down)
5. Jill first: (left, down)

VI. 1. Nash: (left, up) & (right, down)
2. PO: (right, down)
3. Dom Jack/Jill: no/no
4. Jack first: (right, down)
5. Jill first: (right,down)

VII. 1. Nash: (left,up) & (right, down)
2. PO: (left, up) & (right, down)
3. Dom Jack/Jill: no/no
4. Jack first: (down, right)
5. Jill first: (left, up)

VIII. 1. Nash: (left,up)
2. PO: (left, down) & (right, down)
3. Dom Jack/Jill: yes (left)/ no
4. Jack first: (right, down)
5. Jill first: (left, up)

4. Multiple Choice (5 points)
(1 pt each)

i. The initial holdings of an individual in an Edgeworth box is referred to as
a. the contract point.
b. the endowment point.
c. the Pareto preferred point.
d. the competitive equilibrium point.

ii. In an Edgeworth box, a point where two indifference curves are tangent represents
a. the initial endowment point.
b. an allocation that both consumers prefer to the initial endowment.
c. a competitive equilibrium.
d. a Pareto-optimal allocation of goods.

iii. Analysis of an Edgeworth box economy shows that a competitive equilibrium
a. must be Pareto optimal.
b. can be located anywhere along the contract curve.
c. may lie anywhere within the region of mutual advantage.
d. must lie to the southeast of the endowment point.

iv. In order to practice *any form* of price discrimination, a monopoly must be able to
a. identify the maximum price that each customer is willing to pay.
b. separate its customers into distinct groups.
c. prevent resale of its product.
d. establish a legal barrier to entry.

v. Second-degree price discrimination generally takes the form of
a. special prices for students and seniors.
b. membership clubs.
c. quantity discounts.
d. “extras” like free delivery and free customer service.