

Datasheet: None

- 1 (a) (i) Explain the concept of the marginal rate of substitution between two goods. [10]

Answer:

Starting with a utility function, show that the MRS is the trade off between goods that keeps the (ordinal) utility unchanged. Explain with a diagram, pointing out that the MRS is the slope of an indifference curve.

- (ii) Is it possible for a consumer to maximise utility if the marginal rate of substitution is not equal the ratio of their prices? [10]

Answer:

Point out that if preferences are non-convex, utility will be maximised when the consumption bundle has all of one good and none of the other. Changes in the price ratio will not lead to marginal substitution between goods. Likewise, if the indifference curves have kinks or the budget constraint has kinks.

- (b) To encourage energy conservation, utility companies charge consumers a higher rate on units of energy consumed in excess of some threshold amount. In contrast, a common marketing ploy by other firms is to offer “quantity discounts” to consumers who purchase large quantities of a good. To illustrate how these pricing schemes alter the typical consumer’s opportunity set, suppose income = £100, $P_x = £2$ if the consumer buys less than 40 units of X, $P_x = £3$ if the consumer buys more than 40 units of X, and $P_y = £5$. Draw the budget constraint. How would the budget constraint change if the price decreased to £1 after 40 units of X were consumed. [35]

Answer:

Figures a and b represents the budget constraint for the first and second parts.

Figure a

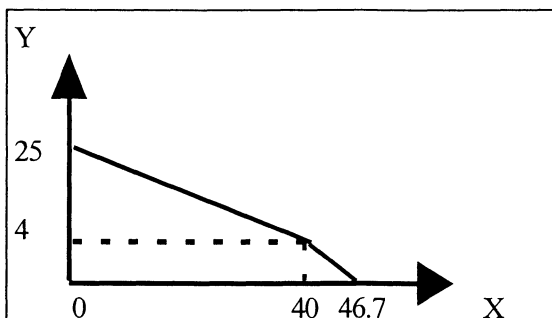
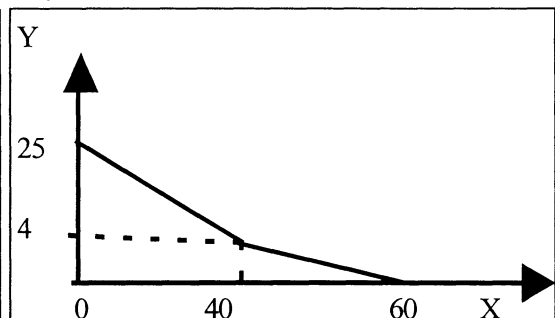


Figure b



(c) Explain what would happen to the equilibrium consumption of two goods, X and Y, if:

(i) income doubled and all prices tripled [15]

Answer:

When both goods are normal, the consumption of both goods will decline. When one good is inferior, consumption of the inferior good will increase and the consumption of the normal good will decrease.

(ii) all prices doubled and income tripled [15]

Answer:

When both goods are normal, consumption of both goods will increase. When one of the goods is inferior, consumption of the normal good will increase and consumption of the inferior good will decrease.

(iii) all prices and income doubled [15]

Answer:

Nothing will happen to the consumption of either good, whether they be normal or inferior.

2 (a) Explain the concepts of marginal productivity of a factor of production, the technical rate of substitution, and the returns to scale with reference to the technology represented by $g(x, y) = x^{0.6}y^{0.7}$. [40]

Answer: Explain that the Marginal productivity of a factor is the derivative of the production function with respect to the factor of production. The rate of technical substitution is the trade off between factors that keeps the output unchanged. Explain with a diagram, pointing out that the MRTS is the slope of an isoquant.

(b) Suppose the production function of cars is given by $Q = K^{1/4}L^{3/4}$.

(i) Show that the marginal product of any given quantity of labour increases as capital is increased. [20]

Answer: MP_L can be written as $.75(K/L)^{1/4}$, which increases as K increases.

- (ii) Suppose Japanese and U.S. car manufacturers produce on identical isoquants with this Cobb-Douglas production function and that labour costs are higher in Japan than in the United States. Do car company workers in Japan have a higher marginal product than American car workers? Explain. [20]

Answer: Since the higher labour costs in Japan induces a higher K/L ratio, the result in part (a) implies that the marginal product of Japanese workers is higher than that of American workers.

- (iii) Now suppose Japanese automakers produce on a different isoquant from U.S. firms, but the prices of Japanese and American cars are identical. Do Japanese or American autoworkers have a higher marginal product? Why? [20]

Answer: Since the price of American and Japanese cars are assumed to be identical, the ratio of the value marginal product of American workers to Japanese workers is simply the ratio of the marginal products. Since this ratio equals the ratio of the wages – which is higher in Japan – the conclusion in part (b) is obtained again. Japanese workers have higher marginal products than American workers.

- 3 (a) Would you expect the demand for a monopolistically competitive firm's product to be more or less elastic than that for a monopolist's product? Explain. [20]

Answer:

In general, the demand for a monopolistically competitive firm's product should be more elastic than that of a monopolist's product because there are close substitutes for the former but not for the latter. It is the existence of close substitutes that makes a monopolistically competitive firm's quantity demanded more responsive to price.

- (b) Would collusion be more likely in the shoe industry or in the airline industry? Why? [20]

Answer:

The airline industry is more likely to have collusion than the shoe industry because (i) it is more concentrated, (ii) sells more homogeneous products, (iii) has good records of customers, and (iv) has an easier opportunity to observe and punish cheaters.

(c) You are the manager of a firm in a new industry. You have secured a lead on the only other producer in the market. You know what your competitor's cost function is, and it knows yours. Your products are indistinguishable to the consumer. Your marketing research team has provided you with the following market demand curve: $Q = 1250 - 0.5P$. Your cost function is $C_A(Q_A) = 8Q_A$. Your competitor's cost function is $C_B(Q_B) = 6Q_B$. Your strategy will allow you to decide how much of your product to provide and allow you to place it on the market shortly before your competitor will be able to make its product available for sale. What output level will you choose, and what price will you charge? Explain.

[60]

Answer:

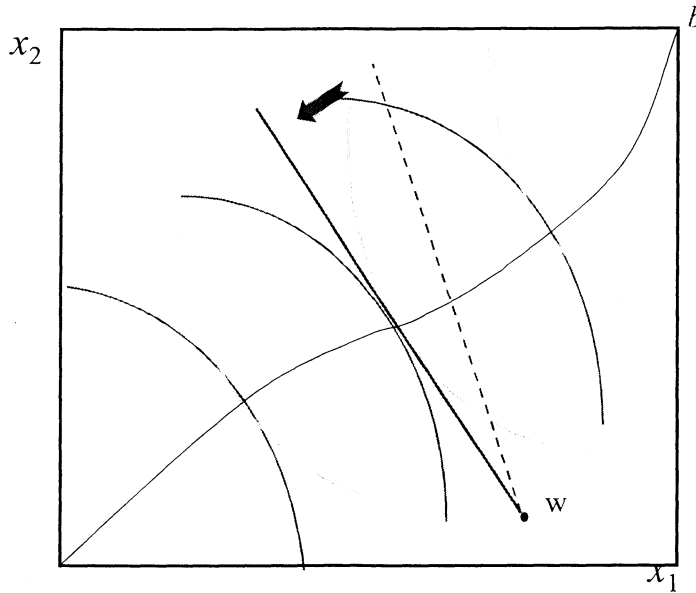
The firm is a Stackelberg leader, and should set the Stackelberg output to maximize profits. First need to convert the given demand equation ($Q = 1250 - 0.5P$) into the corresponding inverse demand function: $P = 2500 - 2Q$. Based on this solve for your Stackelberg output as the leader. This is given by the formula $Q_A = (a + c_B - 2c_A)/2b = (2500 + 6 - 2(8))/4 = 622.5$ units. The follower will produce $Q_B = (a - c_B)/2b - .5Q_A = [2500 - 6]/4 - .5(622.5) = 312.25$ units. Thus, the price of output will be $P = 2500 - 2(622.5 + 312.25) = £630.50$.

4 (a) Using an Edgeworth box diagram, explain what is meant by competitive general equilibrium.

Answer:

Using a two good, two person world example, represent the economy in the form of an Edgeworth box, and explain the notion of the contract curve as the set of all competitive equilibria. From any initial endowment, the economy will converge to an equilibrium on the contract curve. Diagram from lecture reproduced below.

Walrasian / General Equilibrium



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(b) Present and discuss an example of a situation in which a competitive general equilibrium is not the best economic outcome. [60]

Answer:

The underlying notion here is of externalities. If property rights are not assigned, then competitive trading can lead to less than optimal collective welfare. Using the same diagram as above, take one of the “goods” to be the right to peace and quiet (or any other public good), and the other to be “money income”. Consider two individuals with different preferences relating to peace and quiet. Explain that competitive equilibrium reached will involve will be pareto inefficient (with too much noise) if trading takes place with no property rights assigned to peace and quiet. If rights are clearly defined and assigned, then competitive trading can take the economy to a pareto efficient outcome. Students may also approach this question using Prisoner’s dilemma types of examples where individuals maximizing their own utility lead the group as a whole to a socially inefficient outcomes. Credit can be given if they are able to make the connection to competitive general equilibria.

OR

4 Macroeconomic models determine output levels considering the commodities market, and the money market jointly. Examine the following simple macro economic model:

$$C = 300 - 30r + 0.80Y_d$$

$$T = 100 + 0.25Y$$

$$I = 250 - 20r$$

$$G = 480$$

$$M_s = 475$$

$$M_d = 440 + 0.35Y - 70r$$

Where C = Consumption, Y_d = Disposable Income, Y = Income, T = Tax revenue, I = investment, r = interest rate, G = Government expenditure, M_s = Money Supply, M_d = Demand for Money.

(a) Explain and determine the commodities market equilibrium?

[30]

Answer:

Summing $C + I + G$ gives us the aggregate demand curve: $AD^o = 950 - 50r + 0.60Y$

And, setting demand equal to supply Y gives us the equilibrium:

$$Y^o = 950 - 50r + 0.60Y$$

Which can be re-written as the IS-curve

The IS-curve shows combinations of interest rate and output that put the commodities market in equilibrium.

IS-Curve: $Y = 2,375 - 125r$. This can be shown with a diagram

(b) Explain and determine the money market equilibrium?

[30]

Answer:

In the money market,

$$M_s = 475$$

$$M_d = 440 + 0.35Y - 70r$$

These, when equated, gives us the money market equilibrium condition

The LM-curve shows combinations of interest rate and output that put the money market in equilibrium.

LM-curve: $Y = 100 + 200r$. This can be shown with a diagram

(c) What are the equilibrium levels of output, tax and budget deficit?

[40]

Answer:

Setting the two equal to each other gives:

$$2,375 - 125r = 100 + 200r, \text{ or } r^e = 7(\%)$$

Inserting this equilibrium value for the interest rate back into the

LM-curve (or the IS-curve) gives: $Y^e = 1,500$

In turn, all the other equilibrium values can be determined

$$T = 100 + 0.25 (1,500) = 475$$

$$\text{Budget deficit} = G - T = 480 - 475 = \text{PSBR of } 5$$

$$Y_d = (1,500) - 475 = 1,025$$

$$C = 300 - 30(7) + 0.8 (1,025) = 910$$

$$I = 250 - 20(7) = 110$$

Verification:

$M_d = 440 + 0.35 (1,500) - 70(7) = 475$ (same as the M_s). Also, $Y = C + S + T$ or equivalently, $S = Y - C - T$, so that saving $S = 1,500 - 910 - 475 = 115$. Essentially, of the 115 being saved, 110 is going to firms for investment, and the other 5 is being borrowed by the government.

END OF PAPER