

Study Questions 1

Spring 2005

1. Given that a consumer has diminishing MRS, will a consumer ever maximize utility where the MRS is not equal to the price ratio?
2. Is it possible for all goods to be inferior goods? (Assume only two goods and no saving.)
3. Governments sometimes use crop restriction programs in attempts to increase the incomes of farmers. Under what conditions would a restriction in supply result in higher total gross income for farmers?
4. Assume a firm has a cost function of the form $TC(Q) = Q^2 + 100Q + 100$. Why is this necessarily a short-run cost function? Find the fixed cost, average fixed cost, variable cost, average variable cost, average cost and marginal cost.
5. Consumers purchase 40 billion packs of cigarettes, at a price of 3.50 per pack. Studies have shown that the price elasticity of demand is -.5, and the price elasticity of supply is .75. Derive linear demand and supply curves for this market.
6. Let $U(x, y) = 3x + 2y$ be a consumer's utility function, and let $P_x = 3$, $P_y = 5$ be the prices of good x and y, respectively. The consumer's income is 450. Write down the consumer's optimization problem. Graphically determine which constraints will bind. Solve the Lagrangian. Show all work.
7. What is the consumer's demand curve in the above problem?
8. Let $U(x, y) = \sqrt{x} + \sqrt{y}$ be a consumer's utility function, where x is consumption of candy bars and y is consumption of espressos. Let $P_x = 1.50$, and $P_y = 3.25$. Derive this consumer's demand curve. When her income is 150, how many candy bars will she consume? How many espressos? What is her marginal utility of Income?
9. Let a firm's production function be

$$f(K, L) = K + K^{\frac{1}{4}}L^{\frac{3}{4}}$$

What is the marginal product of labor? What is the marginal product of capital? What is the marginal rate of technical substitution? Does this function exhibit increasing, decreasing, or constant returns to scale?

10. Let $w = 5.35$, $r = 15$ be the wage and rental rate of capital. Suppose the firm seeks to produce 200 units of output. Write down the firm's expenditure minimization problem for the above production function, and solve using Lagrangian multipliers.