

ECON 219: Midterm #1

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Problem 1

Let $U(x, y) = \sqrt{x} + \sqrt{y}$. Find the following:

1. Marshallian demand function for x and y .
2. Indirect utility function.
3. Expenditure function.
4. Write the Slutsky equation for good x .

Problem 2

Determine the marginal rate of substitution (MRS) for the following utility functions:

1. $U(x, y) = X^{1/4} + 3y$
2. $U(x, y) = X^{1/4} + y^{1/4}$

Problem 3

What is the effect of imposing a \$10,000 lump-sum tax on a monopolist? Assume the firm continues to operate after the tax.

1. The firm experiences no change in the profit-maximizing price or quantity or in its profit.
2. The firm experiences no change in the profit-maximizing price and quantity, but its profit decreases
3. The firm experiences no change in the profit-maximizing price and quantity, but its profit decreases
4. The firm's profit-maximizing quantity increases, but price does not change.
5. The firm's profit-maximizing price decreases, but quantity does not change.

Problem 4

Consider the production function $q = f(k, l) = l^{0.5}k^{0.1}$. The cost of labor and capital are w and v respectively. Aside from the cost of labor and capital, there are no costs. Initially assume k is fixed at k_1 .

1. Is this function constant return to scale, increasing returns to scale, or decreasing returns to scale? Explain.
2. Find the short run cost function $C_{SR(q)}$
3. Find short run marginal cost.
4. Find short run average cost.
5. Demonstrate that cost is minimized when $AC = MC$.
Now assume all inputs are variables.
6. Find the long run cost function $C_{LR(q)}$.
7. Find long run marginal cost.
8. Use your answer from part (a) to find the elasticity of substitution

Problem 5

A monopolist has a cost function $C(q) = \frac{q^2}{2}$. The monopolist faces a market demand curve given $q = 10 - p$.

1. Find marginal cost.
2. Calculate the profit-maximizing price-quantity combination for the monopolist. Also calculate the monopolist's profits.
3. What output level would be produced by this industry under perfect competition?
4. Calculate the consumer surplus obtained in case (c). Show that this exceeds the sum of monopolist's profit and the consumer surplus received in case (b) What is the value of the dead weight loss from the monopolization?

Problem 6

If the value of the price elasticity of demand is 0.2, this means that

1. a 20% decrease in price cause a 1% increase in quantity demanded.
2. a 5% decrease in price causes a 1% increase in quantity demanded
3. a 0.2% decrease in price causes a 0.2% increase in quantity demanded.
4. a 100% decrease in price cause a 200% increase in quantity demanded.

Problem 7

Suppose the production possibility frontier for an economy that produces on public and one private good (x) is given by

$$x^2 + 100y^2 = 5000$$

This economy is populated by 100 identical individuals, each with a utility function of the form

$$U(x, y) = \sqrt{xy}$$

Where x_i is the individual's share of private good production ($=x/100$). Notice that the public good is nonexclusive and that everyone benefits equally from its level of production.

1. If the market for x and y were perfectly competitive, what levels of those goods would be produced? What would the typical individual's utility be in this situation?
2. What are the optimal production levels for x and y ? What would the typical individual's utility level be? (Hint: The numbers in this problem do not come out evenly, and some approximations should suffice.)

Problem 8

Which of the following is true of perfect price discrimination?

1. Profit is lower than it would be without discrimination.
2. Revenue is higher than it would be without discrimination.
3. (Hint: The numbers in this problem do not come out evenly, and some approximations should suffice.)
4. Profit is zero

Problem 9

If fixed cost at $Q = 100$ is \$130, then

1. fixed cost $Q = 0$ is \$0
2. fixed cost at $Q = 0$ is less than \$130.
3. fixed cost at $Q = 200$ is \$260.
4. fixed cost at $Q = 200$ is \$130.
5. it is impossible to calculate fixed costs at any other quantity.