

Part A

1. Which of the following statement is false
- I) IEPR states that the monopolist's optimal markup of price above marginal cost expressed as a percentage of price is equal to minus the inverse of the price elasticity of demand.
 - II) IEPR tells us that the price elasticity of demand plays a vital role in determining what price a monopolist should charge to maximize profits .
 - III) The relationship between marginal revenue and marginal cost is another way to express monopolist's profit-maximization condition.
- a) I and II are true.
 - b) I and III are false.
 - c) I is true; II is false.
 - d) all the above is true

Ans: A

Page Reference: 416

2. Suppose a monopolist faces demand $P = 400 - 4Q^d$ and has constant marginal cost $MC = 80$. If this monopolist engages in first-degree price discrimination, total output will equal
- a) 20 units.
 - b) 40 units.
 - c) 60 units.
 - d) 80 units.

Ans: D

Page Reference: 450-452

3. Suppose that firms A and B are Cournot duopolists in the salt industry. The market demand curve can be specified as $P = 200 - Q_A - Q_B$. The marginal cost to each firm is \$40. Suppose that firm A is producing 100 units. What is firm B's profit-maximizing quantity?
- a) 100
 - b) 60
 - c) 30
 - d) 20

Ans: C

Page Reference: 484-485

4. In Game 3 above,
- a) Player A choosing A1 and Player B choosing B1 is a Nash equilibrium.

- b) Player A choosing A1 and Player B choosing B3 is a Nash equilibrium.
- c) Player A choosing A3 and Player B choosing B1 is a Nash equilibrium.
- d) Player A choosing A3 and Player B choosing B3 is a Nash equilibrium.

Ans: A

Page Reference: 525-527

5. A decision-maker is faced with a choice between a lottery with a 30% chance of a payoff of \$30 and a 70% chance of a payoff of \$80, and a guaranteed payoff of \$65. If the decision maker's utility function is $U = \sqrt{I}$, what is the risk-premium associated with this choice?
- a) \$1.59
 - b) \$2.52
 - c) \$0
 - d) \$4

Ans: B

Page Reference: 562-563

6. Two individuals, A and B, consume two goods, x and y . Together they have 4 units of x and 8 units of y . For Consumer A the $MRS_{x,y}^A = \frac{5x}{3y}$ and for Consumer B the $MRS_{x,y}^B = \frac{3x}{y}$. Which of the following allocations is an efficient allocation of goods x and y ?
- a) Consumer A has 5 units of x and 3 units of y , and Consumer B has 3 units of x and 1 unit of y .
 - b) Consumer A has 3 units of x and 5 units of y , and Consumer B has 1 unit of x and 3 units of y .
 - c) Consumer A has 2 units of x and 6 units of y , and Consumer B has 6 units of x and 2 units of y .
 - d) Consumer A has 7 units of x and 2 units of y , and Consumer B has 1 unit of x and 6 units of y .

Ans: B

Page Reference: 620

1. Suppose a monopolist faces demand $Q^d = 200 - 5P$ and has a constant marginal cost of \$5.
- a) What price should the monopolist charge to maximize its profits?

Answer

To find the profit-maximizing price, set $MR = MC$.

$$Q = 200 - 5P$$

$$5P = 200 - Q$$

$$P = 40 - 0.20Q$$

$$MR = 40 - 0.40Q$$

$$40 - 0.40Q = 5$$

$$Q = 87.5$$

At $Q = 87.5$, the monopolist will charge a price
 $P = 40 - 0.20(87.5) = 22.50$.

Page Reference: 405-407

- b) What is the Lerner Index of Market Power for this monopolist?

Answer

To calculate the Lerner Index, calculate

$$L = \frac{P - MC}{P}$$

$$L = \frac{22.50 - 5}{22.5}$$

$$L = 0.78$$

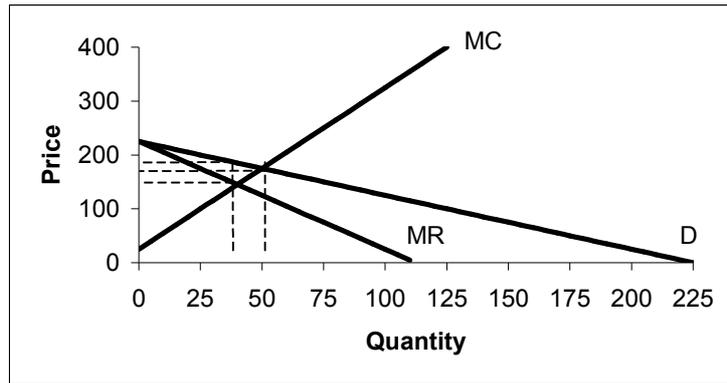
Page Reference: 421-422

2. Suppose a monopolist faces demand $P = 225 - Q$ and has marginal cost $MC = 25 + 3Q$. Complete the following table identifying consumer surplus, producer surplus, total surplus, and deadweight loss for two situations: (1) the monopoly charges a uniform price and (2) the monopoly engages in first-degree price discrimination.

	Uniform Price	First-degree Price Discrimination
Consumer Surplus		
Producer Surplus		
Total Surplus		
Deadweight Loss		

Answer

The following figure illustrates the two situations.



With uniform pricing the monopoly charges \$185 for each unit and sells 40 units. With first-degree price discrimination, the last unit is sold for \$175 and the monopoly sells 50 units. Here is the completed table.

	Uniform Price	First-degree Price Discrimination
Consumer Surplus	800	0
Producer Surplus	4,000	5,000
Total Surplus	4,800	5,000
Deadweight Loss	200	0

Page Reference: 448-451

3. Consider a simple bundling problem in which a producer sells two products to three potential customers. The customer's reservation prices for the two products and the firm's marginal costs are given in the following table.

	Reservation Prices	
	Product A	Product B
Customer 1	50	40
Customer 2	75	30
Customer 3	100	10
Marginal Cost	10	5

- a) If the firm does not bundle the products, what price should it charge for Product A and for Product B to maximize profit? How much profit will the firm expect to earn?

Answer

If the firm does not bundle the products, then for Product A the firm should charge a price of \$75. At this price, the firm will sell Product A to Customer's 2 and 3 earning \$150 in revenue (with \$20 in cost). For Product B, the firm should charge a price of \$30. At this price the firm will sell Product B to Customer's 1 and 2 earning \$60 in revenue (with

\$10 in cost). The firm's profit will be total revenue, \$210, less total cost, \$30, or \$180.

Page Reference: 469-471

- b) If the firm can bundle the products, what price should it charge to maximize profit and how much profit can it expect to earn? How does this compare to result in part a)?

Answer

If the firm can bundle the products, then when determining the profit-maximizing price it looks at the reservation prices for the bundle. These are \$90, \$105, and \$110 for the three Customers. With these reservation prices, the firm will maximize profits by setting price at \$90 for the bundle. At this price, the firm will sell bundles to all three Customers earning revenue of \$270 and incurring cost of \$45. The firm can expect to earn a profit of \$225, or \$45 more than when they could not bundle.

Page Reference: 469-471

4. Suppose that the market demand for a good is given by $P = 894 - 6Q$. Suppose that the industry consists of 5 firms, each with a marginal cost of \$30 per unit. What is the Cournot equilibrium quantity for each firm? What is the equilibrium market price?

Answer

Firm 1 faces the following demand and marginal revenue curves.

$$P = (894 - 6Q_2 - 6Q_3 - 6Q_4 - 6Q_5) - 6Q_1$$
$$MR = (894 - 6Q_2 - 6Q_3 - 6Q_4 - 6Q_5) - 12Q_1$$

Setting $MR = MC$ implies

$$30 = (894 - 6Q_2 - 6Q_3 - 6Q_4 - 6Q_5) - 12Q_1$$
$$12Q_1 = 864 - 6Q_2 - 6Q_3 - 6Q_4 - 6Q_5$$
$$Q_1 = 72 - 0.5(Q_2 + Q_3 + Q_4 + Q_5)$$

Since in equilibrium each firm will produce the same quantity,

$$Q_1 = 72 - 0.5(4Q_1)$$
$$3Q_1 = 72$$
$$Q_1 = 24$$

Total industry output will be 120 with each of the five firms producing 24 units. At this quantity, market price will be $P = 894 - 120 = 774$.

Page Reference: 486-489

5. Two players, Player 1 and Player 2, are playing a game with three possible strategies, Small, Medium, and Large. The strategies represent potential advertising budgets. Profits for each possible outcome are shown in the following table.

		<i>Player 1</i>		
		Small	Medium	Large
<i>Player 2</i>	Small	6, 6	18, 14	24, 15
	Medium	14, 18	22, 22	26, 21
	Large	15, 24	21, 26	24, 28

- a) Does Player 1 have a dominant or a dominated strategy?

Answer

Player 1 does not have a dominant strategy. However, Strategy Small is a dominated strategy.

Page Reference: 524-527

- b) Does Player 2 have a dominant or a dominated strategy?

Answer

Player 2 does not have a dominant strategy. However, Strategy Small is a dominated strategy.

Page Reference: 524-527

- c) What is the Nash equilibrium for this game?

Answer

A Nash equilibrium occurs when each player is making the best choice given the choice of the other player. In this case, the first step is to remove the dominated strategy of Small from the game, since neither player will choose Small. This reduces the payoff matrix to a 2x2 matrix.

		<i>Player 1</i>	
		Medium	Large
<i>Player 2</i>	Medium	22, 22	26, 21
	Large	21, 26	24, 28

Now Player 2 has a dominant strategy of Medium. If Player 1 knows that Player 2 will choose Medium, Player 1 will choose Medium. Thus, the Nash equilibrium is for each player to choose Medium.

Page Reference: 524-527

6. Two consumers, Sammy and Spencer, have two goods, pizza and ice cream. Sammy and Spencer have an equal allocation of the two goods: each has 5 slices of pizza and 4 gallons of ice cream. However, Sammy and Spencer have very different preferences for these two goods. Sammy loves ice cream but derives no utility from pizza. Spencer loves pizza but derives no utility from ice cream.
- a) Is this an efficient allocation of pizza and ice cream?

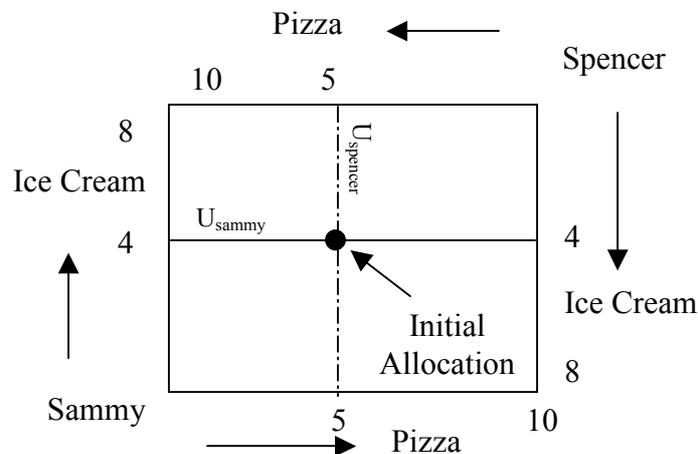
Answer

For an allocation to be efficient, it must be the case that we cannot reallocate the goods without making someone worse off. In this case, any reallocation that takes pizza away from Sammy and gives some to Spencer increases Spencer's utility without lowering Sammy's utility. Any reallocation that takes ice cream away from Spencer and gives some to Sammy increases Sammy's utility without lowering Spencer's utility. Since this type of reallocation is possible, the initial allocation is not efficient.

Page Reference: 610-613

- b) Draw the Edgeworth box, the initial allocation, and the indifference curves for Sammy and Spencer.

Answer



Page Reference: 617-618

- c) Identify the contract curve.

Answer

The contract curve shows all allocations of goods in the Edgeworth box that are economically efficient. Any allocation that gives any pizza to Sammy or that gives any ice cream to Spencer is not efficient, because giving pizza to Spencer raises Spencer's utility without lowering Sammy's utility, and giving ice cream to Sammy raises Sammy's utility without lowering Spencer's utility. Therefore, the

contract curve consists of a single point, where Sammy has all 8 gallons of ice cream and 0 pizzas and Spencer has all 10 pizzas and 0 gallons of ice cream.

Page Reference: 613-615

7. Consider a product, Y, that generates a positive externality. Demand for product Y is given by

$$MPB = 5,000 - Q$$

where MPB is the marginal private benefit when Q units are consumed. In addition to the marginal private benefit, each unit consumed yields a marginal external benefit equal to

$$MEB = 1,000$$

The marginal cost of supplying product Y is $MC = Q$.

- a) What are the equilibrium price and quantity for product Y with no government intervention?

Answer

With no government intervention, the equilibrium will occur where $MPB = MC$. This will occur at

$$\begin{aligned} 5,000 - Q &= Q \\ Q &= 2,500 \end{aligned}$$

At this quantity the equilibrium price will be $P = 2,500$.

Page Reference: 650-652

- b) How many units of product Y should be consumed at the social optimum?

Answer

At the social optimum, consumption should occur where the marginal social benefit equals supply. In this case, marginal social benefit is

$$\begin{aligned} MSB &= MPB + MEB \\ MSB &= (5,000 - Q) + 1,000 \\ MSB &= 6,000 - Q \end{aligned}$$

To find the socially optimal quantity, set $MSB = MC$. This yields

$$\begin{aligned} 6,000 - Q &= Q \\ Q &= 3,000 \end{aligned}$$

Thus, at the social optimum, 3,000 units should be consumed.

Page Reference: 650-652