EconS 301 – Intermediate Microeconomics
Review Session #9 – Chapter 12: Capturing Surplus

1.   With second-degree price discrimination

    a)   The firm tries to price each unit at the consumer's reservation price.
    b)   The firm offers consumers a quantity discount.
    c)   The firm charges different consumer groups or market segments a different price.
    d)   A buyer can only purchase one product by agreeing to purchase some other product as well.

Answer: Recall second degree price discrimination is based on the quantity of a good purchased. Thus the answer is B.

2.   Identify the truthfulness of the following statements.

    I.   If a seller engages in second-degree price discrimination, the seller captures more producer surplus than with uniform pricing.
    II.   The seller captures the maximum producer surplus by engaging in third- degree price discrimination.

    a)   Both I and II are true.
    b)   Both I and II are false.
    c)   I is true; II is false.
    d)   I is false; II is true.

Answer: All forms of price discrimination allow the producer to capture more surplus than uniform pricing, so statement one is true. And first degree price discrimination occurs when a producer capture ALL surplus from the consumers, so statement two is false. Thus the answer is C.

3.   An expenditure schedule in which the average outlay changes with the number of units purchased is

    a)   Block tariff.
    b)   Nonlinear outlay schedule.
    c)   Average expenditure.
    d)   Usage charges.

Answer: The definition of a nonlinear outlay schedule is one in which the average outlay changes as the number of units purchased changes, thus the answer is B.

4.   Which of the following is NOT a real-world example of third-degree price discrimination?

    a)   A railroad charges more to haul 100 tons of coal than it does to haul 100 tons of grain.
    b)   An airline charges a lower price for a coach ticket purchased four weeks in advance than for the same type of ticket purchased three days in advance.
    c)   A movie theater charges senior citizens a cheaper price for movie tickets than it charges non-senior citizens for the same movie ticket.

d) Sam's Club® warehouses sell bulk quantities of macaroni and cheese for a cheaper per unit price than a grocery store, but the boxes are packaged together so that the customer must buy six boxes at a time.

Answer: Third degree price discrimination occurs when different groups of consumers are identified and charged a different, profit maximizing price, for each type of consumer. Thus choices a-c are all third degree price discrimination, while d is not. Thus, the answer is D.

5. Which of the following is a real-world example of tying?

a) A movie theater charges senior citizens a cheaper price for movie tickets than it charges non-senior citizens for the same movie ticket.

b) Sam's Club® warehouses sell bulk quantities of macaroni and cheese for a cheaper per unit price than a grocery store, but the boxes are packaged together so that the customer must buy six boxes at a time.

c) An airline charges more for a first-class ticket than for a coach ticket.

d) The manufacturer of an instant-prints camera is the only manufacturer of the film that the camera uses.

Answer: In the case of choice d, in order to use the camera, you must purchase the film manufactured by the same firm, thus "tying" the products. Hence, the answer is D.

6. You own a small bookstore. Your hired a marketing firm to calculate your own price elasticity of demand and your advertising elasticity of demand. Assume the firm has provided you with the relevant numbers regardless of minor adjustments in price or advertising budget. Your own price elasticity of demand is around –1.7, and your advertising elasticity of demand is around 0.05. How much should you mark-up your price over your marginal cost for your books?

a) By a factor of 0.41.

b) By a factor of 2.43.

c) By a factor of 37 percent.

d) By a factor of 70 percent.

Answer: Using the inverse elasticity pricing rule, we have

$$\frac{P - MC}{P} = -\frac{1}{\varepsilon_{Q,p}}$$

$$\frac{P - MC}{P} = -\frac{1}{-1.7} = \frac{10}{17}$$

$$P - MC = \frac{10}{17}P$$

$$P\left(1 - \frac{10}{17}\right) = MC$$

$$P = \frac{17}{7}MC = 2.43MC$$

Thus, books should be marked up 2.43 times the marginal cost. Hence, the answer is B.

1. 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.
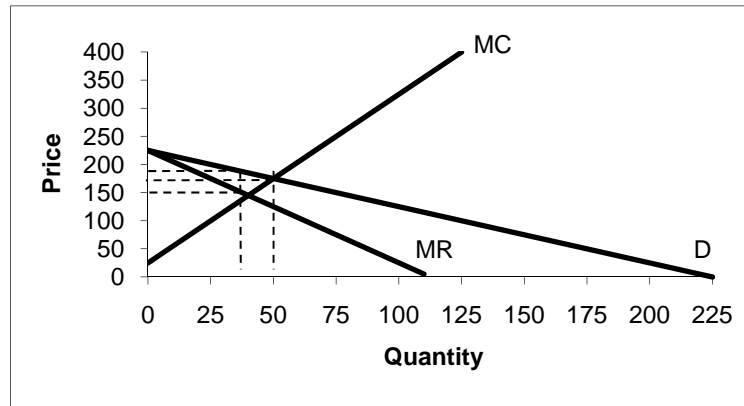
With uniform pricing the monopoly charges $185 for each unit and sells 40 units. With first-degree price discrimination, the last unit is sold for $175 and the monopoly sells 50 units. Here is the completed table.

	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

2. A monopolist faces demand from two different market segments. In the first segment, demand is given by $P_1 = 50 - 2Q_1$ and in the second segment demand is given by $P_2 = 30 - 0.5Q_2$. If the monopolist has a constant marginal cost $MC = 10$, what price should the monopolist charge each market segment and how many units will it sell to each segment if it engages in third-degree price discrimination?

Answer

To maximize profits from third-degree price discrimination, the monopolist should set $MR = MC$ in each market segment. In the first market segment this implies

$$50 - 4Q_1 = 10$$
$$Q_1 = 10$$

At this quantity, the monopoly will charge this segment a price $P_1 = 50 - 2(10) = 30$. In the second market segment we have

$$30 - Q_2 = 10$$
$$Q_2 = 20$$

At this quantity, the monopoly will charge this segment a price $P_2 = 30 - 0.5(20) = 20$.

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.

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)?

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.

4. Suppose you own your own business and you estimate your own price elasticity of demand at -2, and that your advertising elasticity of demand is 0.2.

a) How much should you mark-up your price over your marginal cost for your product to maximize profit?

Answer

To determine the optimal mark-up, use the inverse-elasticity pricing rule.

$$\frac{P-MC}{P} = -\frac{1}{\varepsilon_{Q,P}}$$

$$\frac{P-MC}{P} = -\frac{1}{-2}$$

$$2P - 2MC = P$$

$$P = 2MC$$

This implies that to maximize profit you should set your price at about double the marginal cost.

b) What should your advertising-to-sales ratio be?

Answer

The optimal advertising-to-sales ratio should be

$$\frac{A}{PQ} = -\frac{\varepsilon_{Q,A}}{\varepsilon_{Q,P}}$$

$$\frac{A}{PQ} = -\frac{0.2}{-2}$$

$$\frac{A}{PQ} = 0.10$$

This implies your advertising expenses should be about 10% of your sales revenues.

5. A monopolist faces demand from two different market segments. In the first segment, demand is given by $P_1 = 100 - 5Q_1$ and in the second segment demand is given by $P_2 = 50 - 4Q_2$. If the monopolist has a constant marginal cost $MC = 10$, what price should the monopolist charge each

market segment and how many units will it sell to each segment if it engages in third-degree price discrimination?

Answer

To maximize profits from third-degree price discrimination, the monopolist should set $MR = MC$ in each market segment. In the first market segment this implies

$$10 = 100 - 10Q_1$$
$$10Q_1 = 90$$
$$Q_1 = 9$$

At this quantity, the monopoly will charge this segment a price $P_1 = 100 - 5Q_1 = 100 - 45 = 55$. In the second market segment we have

$$10 = 50 - 8Q_2$$
$$8Q_2 = 40$$
$$Q_2 = 5$$

At this quantity, the monopoly will charge this segment a price $P_2 = 50 - 4Q_2 = 50 - 20 = 30$.

6.   Which of the following are examples of first-degree, second-degree, and third- degree price discrimination?

a)   The local movie theater offers discounts to all senior citizens.

Answer: Third degree—the firm is charging a different price to different market segments.

b)   Baseball tickets are $7 each for individual games. Season tickets are $200 for a 40-game season.

Answer: Second degree—the firm is offering quantity discounts.

c)   On Saturday afternoon, there is an auction of furniture, dishes, etc. from an estate.

Answer: First degree—each consumer is paying near his/her maximum willingness to pay.

d)   Two people are sitting at a dinner table on a 3-day cruise to the Bahamas. The first man says what a great deal he got for the trip because the ship had empty cabins. He paid $300. The second man is embarrassed to say that he booked his trip six months prior and paid $500 for a similar cabin.

Answer: Third degree—the firm is charging a different price to different market segments.