1) Two firms, the Alliance Company and the Bangor Corporation, produce vision systems. The demand curve for vision systems is

$$P = 200{,}000 - 6(Q_1 + Q_2),$$

where P is the price (in dollars) of a vision system, Q_1 is the number of vision systems produced and sold per month by Alliance, and Q_2 is the number of vision systems produced and sold per month by Bangor. Alliance's total cost (in dollars) is

$TC_1 = 8{,}000Q_1$

Bangor's total cost (in dollars) is

$TC_2 = 12{,}000Q_2$

a. If managers at these two firms set their own output levels to maximize profit, assuming that managers at the other firm hold constant their output, what is the equilibrium price?

b. What is the output of each firm?

c. How much profit do managers at each firm earn?

Solution:

a. Let us calculate the profi ts of each fi rm.

Alliance and Bangor's profi ts can be written as

$\pi 1 =[200{,}000 - 6(Q1 +Q2)]Q1$ _-$8{,}000Q1 =192{,}000Q1 -6Q^2{}_1 - 6Q1Q2$

$\pi 2 = [200{,}000 - 6(Q1 + Q2)]Q2 -12{,}000Q2 = 188{,}000Q2 - 6Q^2{}_2 - 6Q1Q2$

Profi t- maximizing levels of output are determined by setting the first derivative of each firm's profit function equal to zero and solving for $Q1$ and $Q2$.

$d\pi 1/dQ1 =192{,}000 -12Q1 - 6Q2 = 0$

$d\pi 2/dQ2 =188{,}000 - 6Q1 -12Q2 =0$

Rewrite the above equations as

$12Q1 + 6Q2 =192{,}000$

$6Q1 + 12Q2 =188{,}000$

Multiply the fi rst equation by -2 and add the resulting two equations to eliminate $Q2$. We obtain then

$-18Q1 =-196{,}000$. Hence, we have $Q1 = 10{,}888.89$.

Plugging this value into any of the above equations gives

$12(10{,}888.89) + 6Q2 = 192{,}000$

That is, $Q2 = 10{,}222.22$.

Price:

$P = 200{,}000 -6(10{,}888.89 +10{,}222.22) = \$73{,}333.34$

b. Alliance's output is obtained above and is equal to 10,888.89, and Bangor's output is 10,222.22.

c. Profi ts will be

$p1 =192{,}000Q1 -6Q^2{}_1 - 6Q1Q2 =\$711{,}407{,}550$

$p2 = 188{,}000Q2 - 6Q^2_2 - 6Q1Q2 = \$626{,}962{,}890$

2) The reservation prices (in dollars) of three classes of demanders (classes *A*, *B*, and *C*) for Ricky Parton's (a Latin country- western singer) compact disks are given in the table that follows:

Class	CD 1	CD 2
A	11	5
B	8	9
C	9	10

It costs \$4 to produce and distribute each compact disk. The company can sell each CD separately, can put them together as a boxed set (that is, as a pure bundle), or can sell them in a mixed bundling format (offer the CDs both separately and as a boxed set). Assume that each demander wants only one of each of the CDs at the reservation price (or at any lower price) and that there are an equal number of demanders in each class. For simplicity, assume that the only costs are those mentioned here.

a. What pricing method would you advise Ricky's company to use?
b. How much better (profi twise) is the best pricing method than the second most profi table pricing method?

Solution:
a. Pricing the two- CD bundle at \$16 will yield revenue = \$48. This is the best pricing method.
b. Separate pricing, with the price of CD 1 = 8 and the price of CD 2 = 9 will yield revenue =42. The second- best pricing method is \$6 worse than the best method.

The third best situation is mixed bundling. Remember mixed bundling consists of choosing a price for the bundle and a price for the individual items that maximize the consumer surplus taken for the consumers.

3) The demand for a strong demander for a round of golf is

$P_S = 6 - Q_S$

where Q_S is the number of rounds demanded by a strong demander when the price of a round of golf is P_S.

The demand for a weak demander for a round of golf is

$P_W = 4 - Q_W$

where Q_W is the number of rounds demanded by a weak demander when the price of a round of golf is P_W.

The cost of providing an additional round of golf to either type of golfer is a constant 2.

There is one golfer of each type.
The club has decided that the best pricing policy is a two- part tariff. However, it's your job to tell the club the optimal entry fee and the optimal use fee to maximize the club's profit. The club cannot price discriminate on either the use or the entry fee. The club's fixed cost is 1.

What are the club's optimal use fee and the optimal entry fee?

Solution:

Remember we want the strategy that maximizes profit. Since fixed costs are the same for all strategies we can maximize variable cost profits. Variable cost profits are simply profits which do not consider fixed cost and only include variable costs. When we charge P=AVC=MC there is no additional profit from charging per round of golf since we are only covering variable costs.

There are three alternative strategies.
Strategy 1: Charge a price equal to marginal cost and charge an entry fee based on the strong demand. In this case, *P* = 2, *Q* = 4, and the entry fee, and the variable cost profit, is (6 -2)(4)/2 =8.

Strategy 2: Charge a price equal to marginal cost and charge an entry fee based on the weak demand. In this case, *P* =2, *Q* = 6, the entry fee is (4 - 2)(2)/2 = 2, and the variable cost profit =4.

Strategy 3: Charge a price greater than *MC* that maximized variable cost profi t and charge an entry fee based on weak demand. In this case, *P* = 3, *Q* _=4, the entry fee is (4 - 3)(1)/2 = 1/2, and the variable cost profit -= 5.
Strategy 1 is the best alternative.