Chapter 16

1. In which market structure would you place each of the following products: monopoly, oligopoly, monopolistic competition, or perfect competition? Why?

a. Retail market for water and sewerage services

Answer:
Monopoly, only one firm from which to purchase.

b. Economics textbooks

Answer:
Monopolistic competition, many firms each selling differentiated products.

c. Economics, by N. Gregory Mankiw and Mark P. Taylor

Answer:
Monopoly, only one firm can produce it due to copyright laws.

d. Photographic film

Answer:
Oligopoly, few firms (Fuji, Kodak) selling similar products.

e. Restaurants in a large city

Answer:
Perfect competition, many firms selling identical products.

f. Car tyres

Answer:
Oligopoly, few firms (Goodyear, Bridgestone, Michelin) selling very similar products.

g. Breakfast cereal

Answer:
Oligopoly, few firms (Kellogg's, Nestle) selling similar products.

h. Gold bullion

Answer:
Monopoly, only one firm from which to purchase.

i. Air travel from any one airport

Answer:
Oligopoly, few airlines from which to choose at any one airport, similar product.
Note: While monopoly and competition are more easily distinguished, the line between oligopoly and monopolistic competition is not as sharp. For example, (b) might be considered to be an oligopoly since there are relatively few publishers and economic text books may be considered to be very similar, and (g) might be considered to be monopolistic competition if the products are considered to be differentiated, and so on.

2. The following information describes the demand schedule for a unique type of apple. This type of apple can only be produced by two firms because they own the land on which these unique trees spontaneously grow. As a result, the marginal cost of production is zero for these duopolists, causing total revenue to equal profit.

a. Complete the following table.

Price per box	Quantity (in boxes)	Total revenue (profit)
€12	0	_____
11	5	_____
10	10	_____
9	15	_____
8	20	_____
7	25	_____
6	30	_____
5	35	_____
4	40	_____
3	45	_____
2	50	_____
1	55	_____

Answer:

Price per box	Quantity (in boxes)	Total revenue (profit)
€12	0	€0
11	5	55
10	10	100
9	15	135
8	20	160
7	25	175
6	30	180
5	35	175
4	40	160
3	45	135
2	50	100
1	55	55
0	60	0

b. If the market were perfectly competitive, what price and quantity would be generated by this market? Explain.

Answer:
In a competitive market, competition reduces the price until it equals marginal cost (which is zero in this case), therefore P = €0 and Q = 60.

c. If these two firms colluded and formed a cartel, what price and quantity would be generated by this market? What is the level of profit generated by the market? And what is the level of profit generated by each firm?

Answer:
These duopolists would behave as a monopolist, produce at the level that maximizes profit, and agree to divide the production levels and profit. Therefore, P = €6, Q = 30 for the market. Profit = €6 x 30 = €180. Each firm produces 15 units at €6 and receives profit of €90 (half of the €180).

d. If one firm cheats and produces one additional increment (five units) of production, what is the level of profit generated by each firm?

Answer:
Cheating firm: 20 x €5 = €100, other firm: 15 x €5 = €75.

e. If both firms cheat and each produces one additional increment (five units) of production (compared to the cooperative solution), what is the level of profit generated by each firm?

Answer:
Each firm: 20 x €4 = €80.

f. If both firms are cheating and producing one additional increment of output (five additional units compared to the cooperative solution), will either firm choose to produce an additional increment (five more units)? Why? What is the value of the Nash equilibrium in this duopoly market?

Answer:
No, because the profit would fall for the cheater to 25 x €3 = €75 which is below €80 profit from part (e) above. Therefore, the Nash equilibrium is each firm producing 20 units (40 for the market) at a price of €4, creating €160 of profit for the market and each duopolist receives €80 profit.

g. Compare the competitive equilibrium to the Nash equilibrium. In which situation is society better off? Explain.

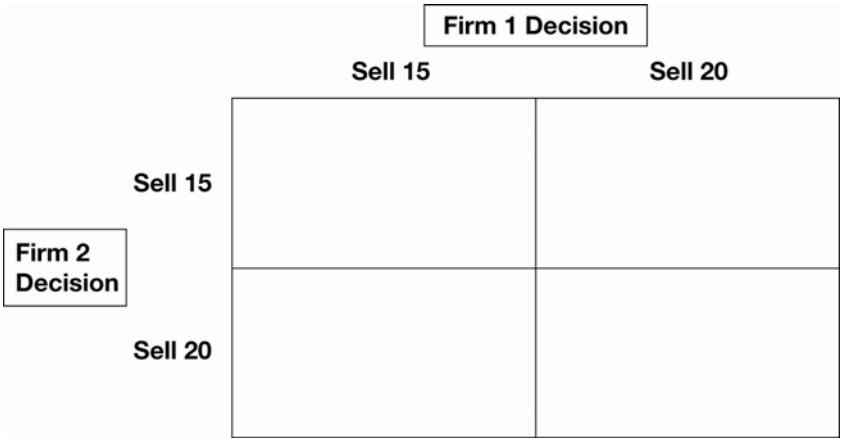
Answer:
The Nash equilibrium has a higher price (€4 compared to €0) and a smaller quantity (40 units compared to 60 units). Society is better off with competitive equilibrium.

h. Describe what would happen to the price and quantity in this market if an additional firm were able to grow these unique apples. (Do not attempt to calculate quantitative changes – the direction of change is all that's required.)

Answer:
The new Nash equilibrium would have a lower price and a larger quantity. It would move toward the competitive solution.

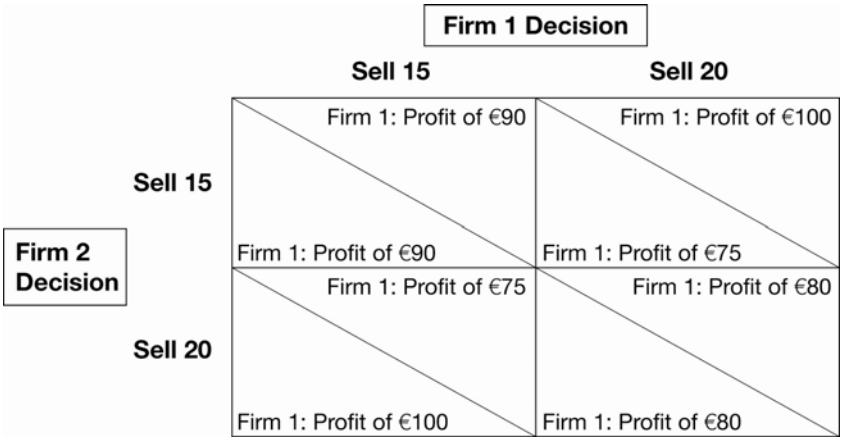
i. Use the data from the duopoly example above to fill in the boxes of the prisoners' dilemma. Place the value of the profits earned by each duopolist in the appropriate box in Exhibit 1.

Exhibit 1



Answer:
See Exhibit 3.

Exhibit 3



j. What is the solution to this prisoners' dilemma? Explain.

Answer:
The dominant strategy for each is to cheat and sell 20 units because each firm's profit is greater when it sells 20 units regardless of whether the other firm sells 15 or 20 units.

k. What might the solution be if the participants were able to repeat the "game?" Why? What simple strategy might they use to maintain their cartel?

Answer:
They might be able to maintain the cooperative (monopoly) production level of 30 units and each produce 15 units because if the game is repeated, the participants can devise a penalty for cheating. The simplest penalty is "tit-for-tat."