**Problem 01**

In the market for apples in Country A, cost curves are shown for both monopoly and perfect competition. Under perfect competition 400 apples are produced at a price of $5 while if the market were operated by Apple Kings (A monopoly) only 150 apples would be produced at a price of $15 per apple. The y-intercept of both Marginal revenue and the demand curve is at $30( i.e. the maximum a consumer is willing to pay in both the cases is $30).

(a) Calculate the consumer surplus if the market were operated by Apple Kings

(b) Identify and calculate the Consumer surplus under perfect competition

(c) What is the difference in consumer surplus if the market should move from perfect competition to monopoly and is this alignment with the theory?

**Answer:**



(a) In monopoly market, CS = ½\*(30 - 15) \* 150 = $1,125

(b) In perfect competition, CS = ½\*(30 - 5) \* 400 = $5,000

(c) If the market moves from perfect competition to monopoly, consumer surplus will decrease by $3,875 (5,000 - 1,125 = 3,875). This is consistent with the theory because, unlike in perfect competition, when there is a monopoly, quantity is determined by the intersection of the MC curve and the MR curve rather than by the demand curve. So there is welfare loss (deadweight loss) in monopoly.

**Problem 02**



1. What are the total fixed costs for the firm when it produces 300 units of output?
2. Suppose the price is $10 and the firm produces 100 units. Will it make a profit or a loss? What will be the amount of profit/ loss?
3. At $10, how much would you recommend that the form produce? At your recommended output level, will the firm make profit or loss and how much?
4. At what price (approximately) would this firm halt production in the short run?

**Answer:**  
  
a)

fixed costs are the same at all level of output

Q=300, ATC=6, and AVC=4.5 from the graph

Total fixed cost =(ATC-AVC)\*Q

=(6-4.5)\*300

=$450

b)

Given, P=$10

At Q=100, ATC=$10

the firm makes zero economic profit as P=ATC

Economic profit= (P\*Q)- (ATC\*Q)= 0

c)

Recommended level of output is at MC=P  
At MC= P, Q= 300

where

Q=300 units

ATC=6

P>ATC so the firm makes profits

Economic profit =(P-ATC)\*Q

=(10-6)\*300

=$1200

d)

A firm produces in the short run at P=MC if the P>Min(AVC)

the minimum AVC is $4.3 (approximately)

so the firm stops producing at a price below 4.3.

**Problem 03**

Bob produces DVD movies for sale which requires only a building and a machine that copies the original movies into a DVD. Bob rents a building for $30,000 per month and rents a machine for $20,000 a month. These are his fixed costs. His variable costs are given in the table. Current price of a DVD is $20.

| Q | FC | VC | TC | MC | AFC | AVC | ATC | TR | MR | MR-MC |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 50,000 |  | 50,000 |  |  |  |  |  |  |  |
| 1,000 | 50,000 | 5,000 | 55,000 | ***DTC/DQ*** | ***FC/Q*** | ***VC/Q*** | ***TC/Q*** |  | ***DTR/DQ*** |  |
| 2,000 | 50,000 | 8,000 | 58,000 |  |  |  |  |  |  |  |
| 3,000 |  | 9,000 |  |  |  |  |  |  |  |  |
| 4,000 |  | 14,000 |  |  |  |  |  |  |  |  |
| 5,000 |  | 20,000 |  |  |  |  |  |  |  |  |
| 6,000 |  | 33,000 |  |  |  |  |  |  |  |  |
| 7,000 |  | 49,000 |  |  |  |  |  |  |  |  |
| 8,000 |  | 72,000 |  |  |  |  |  |  |  |  |
| 9,000 |  | 99,000 |  |  |  |  |  |  |  |  |
| 10,000 |  | 1,50,000 |  |  |  |  |  |  |  |  |

a. Calculate TC, MC, AFC, AVC, ATC, TR, MR, and [MR-MC] for each level of output.

b. Identify the optimum level of output and explain your answer.

c. What is Bob’s TR at the profit maximizing level of output?

d. Identify Bob’s break-even price and shut down price.

e. What is Bob’s profit at the optimum level of output?

f. Suppose the price becomes $15.

1. What will be the new MR?
2. Calculate [MR-MC].
3. Identify the new profit maximizing level of output.
4. Calculate the new TR.

g. If price continues to stay at $15, should Bob continue producing DVD movies or leave the business in the short run?

**Answer:**

| Q | FC | VC | TC | MC | AFC | AVC | ATC | TR | MR | MR-MC |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | ***50,000*** | ***0*** | 50000 |  |  |  |  |  |  |  |
| 1,000 | ***50,000*** | 5,000 | ***55000*** | ***5*** | ***50*** | ***5*** | ***55*** | ***20000*** | ***20*** | ***15*** |
| 2,000 | ***50,000*** | 8,000 | ***58000*** | ***3*** | ***25*** | ***4*** | ***29*** | ***40000*** | ***20*** | ***17*** |
| 3,000 | ***50,000*** | 9,000 | ***59000*** | ***1*** | ***16.67*** | ***3*** | ***19.67*** | ***60000*** | ***20*** | ***19*** |
| 4,000 | ***50,000*** | 14,000 | ***64000*** | ***5*** | ***12.5*** | ***3.5*** | ***16*** | ***80000*** | ***20*** | ***15*** |
| 5,000 | ***50,000*** | 20,000 | ***70000*** | ***6*** | ***10*** | ***4*** | ***14*** | ***100000*** | ***20*** | ***14*** |
| 6,000 | ***50,000*** | 33,000 | ***83000*** | ***13*** | ***8.33*** | ***5.5*** | ***13.33*** | ***120000*** | ***20*** | ***7*** |
| 7,000 | ***50,000*** | 49,000 | ***99000*** | ***16*** | ***7.14*** | ***7*** | ***14.14*** | ***140000*** | ***20*** | ***4*** |
| 8,000 | ***50,000*** | 72,000 | ***122000*** | ***23*** | ***6.25*** | ***9*** | ***15.25*** | ***160000*** | ***20*** | ***-3*** |
| 9,000 | ***50,000*** | 99,000 | ***149000*** | ***27*** | ***5.56*** | ***11*** | ***16.56*** | ***180000*** | ***20*** | ***-7*** |
| 10,000 | ***50,000*** | 1,50,000 | ***200000*** | ***51*** | ***5*** | ***15*** | ***20*** | ***200000*** | ***20*** | ***-31*** |

1. optimum level of output is 7000

To determine the optimum level of output, we need to find the level of output where Bob's profit is maximized. This occurs where marginal revenue equals marginal cost (MR = MC). When MR is greater than MC, it means that Bob can increase his profit by producing more, while when MC is greater than MR, it means that Bob can increase his profit by producing less.

In the table, we can see that the marginal cost is lowest at an output level of 7,000, where it is equal to $16. This means that producing one more unit of output beyond this level would result in a higher cost than the additional revenue earned, leading to a decrease in profit. Therefore, the optimum level of output for Bob is 7,000 units.

1. $140,000
2. At minimum ATC which is $13.33.
3. Profit = TR-TC = 140000-99000 = $41000
4. 1)15   
   2)

| Q | FC | VC | TC | MC | AFC | AVC | ATC | TR | MR | MR-MC |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 50,000 | 0 | ***50000*** |  |  |  |  |  |  |  |
| 1,000 | 50,000 | 5,000 | ***55000*** | ***5*** | ***50*** | ***5*** | ***55*** | ***15000*** | ***15*** | ***10*** |
| 2,000 | 50,000 | 8,000 | ***58000*** | ***3*** | ***25*** | ***4*** | ***29*** | ***30000*** | ***15*** | ***12*** |
| 3,000 | 50,000 | 9,000 | ***59000*** | ***1*** | ***16.67*** | ***3*** | ***19.67*** | ***60000*** | ***15*** | ***14*** |
| 4,000 | 50,000 | 14,000 | ***64000*** | ***5*** | ***12.5*** | ***3.5*** | ***16*** | ***80000*** | ***15*** | ***10*** |
| 5,000 | 50,000 | 20,000 | ***70000*** | ***6*** | ***10*** | ***4*** | ***14*** | ***100000*** | ***15*** | ***9*** |
| 6,000 | 50,000 | 33,000 | ***83000*** | ***13*** | ***8.33*** | ***5.5*** | ***13.33*** | ***120000*** | ***15*** | ***2*** |
| 7,000 | 50,000 | 49,000 | ***99000*** | ***16*** | ***7.14*** | ***7*** | ***14.14*** | ***140000*** | ***15*** | ***-1*** |
| 8,000 | 50,000 | 72,000 | ***122000*** | ***23*** | ***6.25*** | ***9*** | ***15.25*** | ***160000*** | ***15*** | ***-8*** |
| 9,000 | 50,000 | 99,000 | ***149000*** | ***27*** | ***5.56*** | ***11*** | ***16.56*** | ***180000*** | ***15*** | ***-12*** |
| 10,000 | 50,000 | 1,50,000 | ***200000*** | ***51*** | ***5*** | ***15*** | ***20*** | ***200000*** | ***15*** | ***-36*** |

3) 6000

4) 6000\*15 = $90000

1. At $15

P > min ATC

P> min AVC

abnormal profit

Bob should continue producing DVD movies in the short run.

In contrast, in a monopoly, there is only one seller of the product, which means that the seller has market power and can influence the price. The demand curve faced by the monopolist is downward sloping, which means that to sell more units, the monopolist must lower the price of all units sold. This means that the marginal revenue earned from selling an additional unit is less than the market price, because the monopolist has to lower the price of all previous units sold. Therefore, in a monopoly, MR < P (market price).