19
REVENUE

19.1 INTRODUCTION

In the previous lesson you have learnt the various concepts of cost as used in micro economics. In this lesson you will learn about the concept of revenue. Let us remind ourselves that we are studying the concepts of cost and revenue because the aim is to know how profit is calculated in micro economics. You know by now that the aim of a producer generally is to earn maximum possible profit. It is in this context that we study the various measures of revenue.

19.2 OBJECTIVES

After going through this lesson you will be able to :

- explain the term revenue;
- explain the terms total revenue, average revenue, and marginal revenue;
- calculate total revenue from data on prices and output sold at each price;
- find out average revenue from data on total revenue;
- find out total revenue from data on average revenue;
- find out marginal revenue from data on average revenue;
- find out total revenue and average revenue from data on marginal revenue;
- differentiate between revenue and profit.

19.3 MEANING OF REVENUE

A producer or a firm produces goods and services for sale in the market. The receipts from selling a product is termed as 'revenue' from that product. For example, suppose a firm produces 2 radios per day and sells them at a market price of Rs. 200 per radio. The total sale receipts from 2 radios are Rs. 400. The total revenue from the sale of 2 radios is thus Rs. 400.

In micro economics, we come across the following three measures of revenue :

(a) Total Revenue (TR)
(b) Average Revenue (AR)
(c) Marginal Revenue (MR)

19.4 TOTAL REVENUE (TR)

Total revenue of a product is the total receipt from the sale of output of that product. It is obtained by multiplying the quantity produced and sold by the price per unit of the product.

$$TR = Q \times P$$

where TR = Total Revenue, Q = Quantity produced and sold, and P = Price per unit of the product.

In table 19.1 level of output and price are given and TR is calculated from these two.

Table 19.1

Output, Selling Price and Total Revenue of a Radio Firm

Output (units)	Price per unit (Rs.)	Total Revenue (Rs.) (Q×P)
1	200	200 (1×200)
2	200	400 (2×200)
3	200	600 (3×200)
4	200	800 (4×200)
5	200	1000 (5×200)

As an example, total revenue when 2 radios are produced and sold is

$$TR = Q \times P$$
$$= 2 \times \text{Rs. } 200$$
$$= \text{Rs. } 400$$

It should now be clear to you that the total revenue that a firm receives is determined by (i) the quantity of the product sold and (ii) the price per unit of the product.

In the above example notice that the price per radio remains the same at all levels of output. It is only one type of market situation where a firm can sell any quantity at a given price. In actual life we come across another market situation in which if a firm wants to sell more it must reduce the price. The firm must induce the buyers to buy more. Reduced price of a product is generally a big temptation for a buyer. You see in practice that if you want to buy

anything in bulk in the market you can bargain for a lower price. This behaviour is not strange. You have learnt in the lesson on demand that consumers normally demand more only at a lower price. For example, if you want to purchase 4 fans for your new house the shopkeeper may give you a discount. He may charge a price lower than what he would have charged if you were to buy only one fan.

Whatever is the market situation the method of calculation of total revenue or any other measure of revenue remains the same. For example, consider the following table 19.2.

Table 19.2

Output, Price and Total Revenue of a Firm Producing Shirts

Output (Nos.)	Price (Rs.)	Total Revenue (Rs.)
1	100	100
2	90	180
3	80	240
4	70	280
5	60	300
6	50	300
7	40	280

Although the method of calculation of TR is the same, the difference arises only in the successive additions to TR. When price is the same at all the levels of output (see table 19.1) the successive additions to TR on account of increase in output is also the same. When price falls as the output level increases (see table 19.2) the successive additions to TR also fall.

INTEXT QUESTIONS 19.1

Tick (✓) mark the correct answer :

(i) Revenue is the same as ....
- (a) profits
- (b) tax
- (c) sales receipts

(ii) Total revenue from the sale of a product is ....
- (a) total cost
- (b) total profits
- (c) total receipts from sales

(iii) When any quantity of a commodity can be sold at a given price, successive additions to total revenue from sale of additional units of output are ....
(a) lower
(b) higher
(c) same

(iv) When higher sales are possible only by lowering the price, successive additions to TR from sale of additional units of output are ....
(a) lower
(b) higher
(c) same

19.5 AVERAGE REVENUE (AR)

Average revenue is simply the average receipt of a producer from the sale of a product. It is obtained by dividing TR by the total quantity (Q) produced and sold.

$$AR = \frac{TR}{Q}$$

Consider the following table 19.3 :

Table 19.3

Output, Price, TR and AR of a Firm Producing Radios

Output and sales (Nos.)	Price per unit (Rs.)	Total Revenue (Rs.)	Average Revenue (TR/Output)
1	200	200	200 (200÷1)
2	200	400	200 (400÷2)
3	200	600	200 (600÷3)
4	200	800	200 (800÷4)
5	200	1000	200(1000÷5)

In the table 19.3 TR at 2 units of output is Rs. 400.

Therefore, $AR = \frac{TR}{Q} = \frac{400}{2} = Rs.\ 200$

Rs. 200 is also the price of radio. You will notice in the table 19.3 that AR and price at each level of output are the same. Normally, a producer sells all the units of a commodity per unit of time at the same price. Therefore, his AR is also the same as price. We can show this in the following manner :

We are given that $AR = \frac{TR}{Q}$ .....(i)

We are also given $TR = P \times Q$ .....(ii)

By substituting the value of TR in (i), we get,

$$AR = \frac{TR}{Q} = \frac{P \times Q}{Q} = P$$

Therefore, $AR = P$

In fact price and average revenue are synonyms.

We have seen in the table 19.3, a market situation in which a producer is able to sell all quantities of output at a given price. We take below the market situation in which the producer is able to sell higher quantities only by offering his product at a lower price.

Table 19.4

Output, Price, TR and AR of a Firm Producing Shirts

Output & Sales (Nos.)	Price (Rs.)	TR (Rs.)	Average Revenue (Rs.)
1	100	100	100
2	90	180	90
3	80	240	80
4	70	280	70
5	60	300	60
6	50	300	50
7	40	280	40

Table 19.4 shows that price is not constant, but price and average revenue at each level of sales are equal.

INTEXT QUESTIONS 19.2

Tick (✓) mark the correct answer :

(i) Average revenue from the sale of output of a product equals :
   (a) TR divided by quantity produced
   (b) Net addition to TR

(ii) When any quantity can be sold at a given price, as a producer produces more of a product, AR ....
(a) falls
(b) rises
(c) remains constant

(iii) When higher sales are possible only at a lower price, as a producer wants to sell more of his product, AR .....
(a) falls
(b) rises
(c) remains constant

19.6 MARGINAL REVENUE (MR)

You are already familiar with the concept of marginal cost. Marginal revenue is also defined in the same manner. Addition to TR, when sales increase by one unit, is termed as marginal revenue. As an illustration consider the following table 19.5 :

Table 19.5

Price, Output, TR and MR of a Firm Producing Radios

Output (Nos.)	Price (Rs.)	TR (Rs.)	Marginal Revenue (Rs.)
1	200	200	200 (200-0)
2	200	400	200 (400-200)
3	200	600	200 (600-400)
4	200	800	200 (800-600)
5	200	1000	200 (1000-800)
6	200	1200	200 (1200-1000)

In the table 19.5 TR from sale of 1 radio is Rs. 200. TR from the sale of 2 radios is Rs. 400. Therefore, MR when 2 radios are sold = TR of 2 radios - TR of 1 radio.

By increasing his sale of radios by 1 unit the producer is able to increase his TR by Rs. 200. Such an increase in TR from the sale of an additional unit of output is the MR.

Let us now take the other market situation in which price is not constant but changes. In table 19.6 such a situation is shown.

Table 19.6

Price, Output, TR and MR of a Firm Producing Shirts

Output (Nos.)	Price (Rs.)	TR (Rs.)	MR (Rs.)
1	100	100	100 (100-0)
2	90	180	80 (180-100)
3	80	240	60 (240-180)
4	70	280	40 (280-240)
5	60	300	20 (300-280)
6	50	300	0 (300-300)
7	40	280	-20 (280-300)

It is shown in the table 19.6 that the producer tempts the consumer to purchase more shirts by offering the shirts at a lower price. In order to induce the consumer to buy 2 shirts instead of 1 he offers to sell each shirt at Rs. 90 instead of Rs. 100. He is able to get a TR of Rs. 180 from the sale of two shirts. If he had sold only 1 shirt he would have got a price of Rs. 100 per shirt and a TR of Rs. 100. By increasing his sale by 1 shirt the producer is able to increase his TR by Rs. 80. It represents the MR when 2 shirts are sold. Similarly we can calculate MR when 3 shirts are sold and so on.

INTEXT QUESTIONS 19.3

Fill in the blanks :

(i) Net addition to ..... on account of increase in sales by one unit is called MR.
(ii) Sales increase from 3 units to 4 units as a result, TR rises from Rs. 100 to Rs. 125 MR is .....
(iii) When more sales are possible only at a lower price, sale of additional units of a commodity ..... MR.
(iv) When higher sales are possible at a given price, sale of additional units of a commodity MR .....
(v) When TR falls MR is .....

19.7 REVENUE AND PROFIT

Revenue, we have seen above, is the receipt from sales of a product. Profit, as we have stated in section 19.1, is the excess of revenue over cost. Therefore, it should be clear that revenue is different from profit. We are emphasizing this distinction because there is a possibility of revenue and profit being taken as same.

19.8 EXAMPLES OF HOW TO CALCULATE TR, MR AND AR

Example 1: To find out AR or Price from TR and Output, we divide TR by the units of output sold. The process is shown in the following table :

Table 19.7

Output (units)	TR (Rs.)	AR = TR/Output (Rs.)
1	11	11
2	16	8
3	21	7
4	24	6

Example 2: To find out TR from MR, we go on adding MR of each successive unit as shown below :

Table 19.8

Output (units)	MR (Rs.)	TR (Rs.)
1	7	7
2	5	12 (7+5)
3	3	15 (7+5+3)
4	2	17 (7+5+3+2)
5	1	18 (7+5+3+2+1)
6	–1	17 (7+5+3+2+1-1)

Example 3: To find out TR from AR, we multiply AR by the output as shown below :

TABLE 19.9

Output (units)	AR (Rs.)	TR = AR × Output (Rs.)
1	9	9
2	8	16
3	7	21
4	6	24
5	5	25

Example 4: To find out MR from AR, we first find TR. From TR we find MR at a given level of output by subtracting from TR of the given level of output,the TR of the previous level of output (which is less by one unit from the given level of output).

Table 19.10

Output (units)	AR (Rs.)	TR (Rs.)	MR (Rs.)
1	10	10	10
2	8	16	6
3	7	21	5
4	6	24	3
5	4	20	-4

Example 5: To find out AR from MR we first find TR. From TR we find AR by dividing TR by the level of output :

Table 19.11

Output (units)	MR (Rs.)	TR (Rs.)	AR (Rs.)
1	80	80	80
2	70	150	75
3	60	210	70
4	30	240	60
5	10	250	50

POINTS TO REMEMBER

- Revenue is the sale receipt from the sale of a product.
- TR is equal to the total output multiplied by price.
- AR is equal to TR divided by output.
- AR is the same as Price.
- MR is the additional revenue from a output level increased by one unit.
- If the price of a product is the same at all levels of output then AR is equal to MR or price at all levels of output.
- If more of a product can be sold only by lowering its price then MR is less than AR or Price as the price of the product falls.

TERMINAL EXERCISE

1. Explain the term 'revenue'. How is it different from profit ?

2. Prepare a schedule based on imaginary data about TR, AR and MR assuming that the price is the same at all the levels of output.

3. Prepare an imaginary TR, AR and MR schedule in a market situation in which the firm is able to sell more only by reducing the price of the product.

4. Complete the following table :

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	5			
2	5			
3	5			
4	5			
5	5			

5. Complete the following table:

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	5			
2	4			
3	3			
4	2			

6. Find out marginal revenue from the following data :

Output (units)	Average Revenue (Rs.)	Marginal Revenue (Rs.)
1	25	
2	23	
3	21	
4	19	
5	18	
6	15	

7. Complete the following table :

Price (Rs.)	Output (units)	Total Revenue (Rs.)
10	-	100
11	9	-
12	-	96
13	7	-
14	-	84
15	5	-
16	-	64

EXTENDED LEARNING

You have already learnt in the lesson No. 14 about the various aspects of a diagram. Let us use the knowledge to represent the various measures of revenue on diagram. We take two market situations described in this lesson separately.

(a) Price is constant as more is sold

The following table is based on this situation

Table 19.12

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	200	200	200	200
2	200	400	200	200
3	200	600	200	200
4	200	800	200	200
5	200	1000	200	200

Let us draw TR, AR and MR curves based on the above data. We represent 'output' on the X-axis and the 'revenue' on the Y-axis.

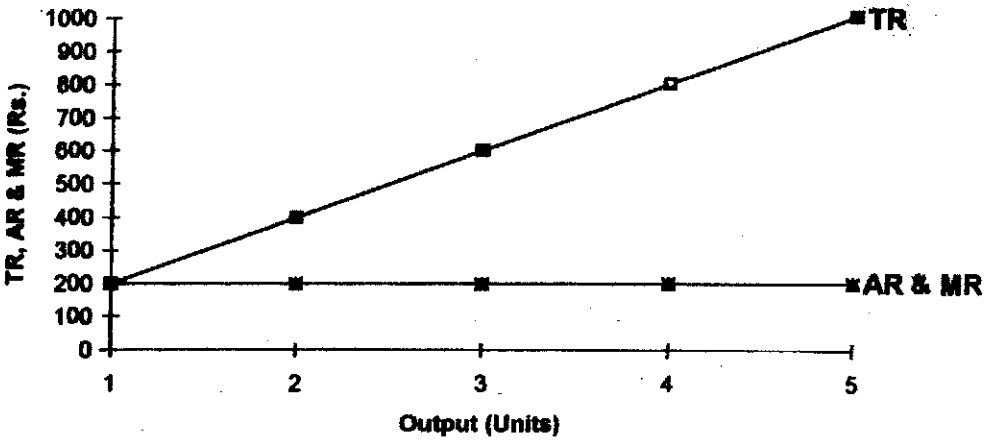

Fig. 19.1 : TR, AR and MR Curves

We observe the following in the above diagram :

(i) TR curve is upward sloping from left to right. It implies that TR is constantly growing as the output level expands.

(ii) AR curve is paralleled to the X-axis because price is the same at all the levels of output.

(iii) MR curve is also parallel to the X-axis because the price being constant the successive additions to the TR on account of increase in output each time is the same.

(iv) MR and AR curves are same because AR=MR at all the levels of output.

All the above observations are ture only in a market situation with price being constant at all the levels of output. If price is not constant then TR, AR and MR curves are of different shapes as shown in the second market situation below :

(b) Price falling as the output increases

The following table is based on this market situation.

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	100	100	100	100
2	90	180	90	80
3	80	240	80	60
4	70	280	70	40
5	60	300	60	20
6	50	300	50	0
7	40	280	40	-20

Let us draw TR, AR and MR curves based on the above data.

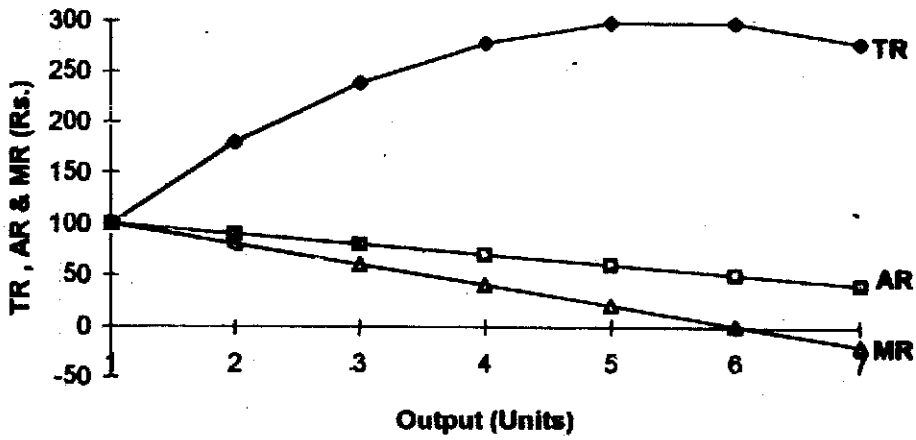

Fig. 19.2 TR, MR and AR Curves

We observe the following in the above diagram :

(i) TR curve is upward sloping upto 5 units. It is constant between 5 and 6 units. It is sloping downward from 7 units onwards.

(ii) AR curve is constantly sloping downwards.

(iii) MR curve is constantly sloping downwards. It cuts X-axis at the output level of 6 units because at this output MR is zero. Beyond 6 units the MR curve lies below the X-axis because MR is negative.

ANSWERS

Intext Questions 19.1

(i) (c) (ii) (c) (iii) (c) (iv) (a)

Intext Questions 19.2

(i) (a) (ii) (c) (iii) (a)

Intext Questions 19.3

(i) TR (ii) Rs. 25 (iii) lowers (iv) remains constant (v) negative.

Terminal Exercise

1. Read section 19.3 and 19.7

2. Read section 19.4, 19.5 and 19.6

3. Read section 19.4, 19.5 and 19.6

4.

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	5	5	5	5
2	5	10	5	5
3	5	15	5	5
4	5	20	5	5
5	5	25	5	5

5.

Output (units)	Price (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	5	5	5	5
2	4	8	4	3
3	3	9	3	1
4	2	8	2	-1

6.

Output (units)	AR (Rs.)	TR (Rs.)	MR (Rs.)
1	25		25
2	23	46	21
3	21	63	17
4	19	76	16
5	18	90	14
6	15	90	0

7.

Price (Rs.)	Output (units)	TR (Rs.)
10	10	100
11	9	99
12	8	96
13	7	91
14	6	84
15	5	75
16	4	64