

⇒ Revenue And Profit functions:-

⇒ Revenue:-

Revenue function is total income from producing unit.

⇒ It means "earning in sense of money".

⇒ Notation:-

It is denoted by "R".

⇒ Mathematically:-

Revenue is equal to number of units sold times price per unit.

To obtain the revenue function multiply output by price function.

$$\Rightarrow R(x) = P \times Q$$

⇒ Revenue And its types:-

⇒ Total Revenue:-

Product of Price and quantity is known as total revenue.

$$\Rightarrow \boxed{TR = P \times Q}$$

⇒ Average Revenue:-

Total revenue by quantity is known as average revenue.

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

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

$$\Rightarrow \boxed{AR = P}$$

⇒ Marginal Revenue:-

Marginal revenue is per unit change in earning.

$$\Rightarrow \boxed{MR = \frac{dR}{dQ}}$$

⇒ Slope of average revenue:-

Slope is obtained by taking derivative. Derivative of AR with respect to quantity (Q) is slope of AR.

$$\Rightarrow \text{Slope of AR} = \frac{dAR}{dQ}$$

⇒ Slope of Marginal Revenue:-

Similarly, derivative of MR with respect to quantity (Q) is slope of MR.

$$\Rightarrow \text{Slope of MR} = \frac{dMR}{dQ}$$

⇒ Note:-

The value of AR is always greater than MR.

⇒ Profit Function:-

⇒ Definition:-

The Profit function is the difference between the revenue and cost function.

⇒ Symbol:-

It is denoted by π .

⇒ Mathematically:-

Mathematically,
$$\pi = TR - TC$$

Here,

TR = Total revenue

TC = Total cost

⇒ Explanation:-

To obtain the profit, we need to know about Total cost function and total revenue.

As, TR is discussed above, So we will discuss about cost function.

⇒ Cost And its family

⇒ T. Cost

Total cost is sum of two functions

- i): Total fixed cost
- ii): Total variable cost

$$\Rightarrow TC = TFC + TVC$$

⇒ Average Cost

Total cost divided quantity is average cost.

$$\Rightarrow AC = \frac{TC}{Q}$$

$$i): AVC = \frac{TVC}{Q}$$

$$ii): AFC = \frac{TFC}{Q}$$

⇒ Marginal Cost

Marginal cost is derivative of TC w.r.t Q.

$$\Rightarrow MC = \frac{dTC}{dQ} = \frac{d}{dQ} (TVC + TFC)$$

⇒ Slope of Average Cost:-

Derivative of average cost w.r.t quantity Q .

$$\Rightarrow \text{Slope of AC} = \frac{dAC}{dQ}$$

⇒ Slope of Marginal cost:-

Derivative of marginal cost w.r.t quantity Q .

$$\Rightarrow \text{Slope of MC} = \frac{dMC}{dQ}$$

⇒ Now, we will proceed to Profit function, which is defined as,

$$\Rightarrow \pi = TR - TC$$

⇒ Steps to find profit:-

There are following steps to find profit:-

⇒ First of all find TR and TC.

⇒ Then, find profit by formula

$$\Rightarrow \pi = TR - TC \Rightarrow 0$$

⇒ Necessary Condition:-

Take first derivative

of profit function from eq ①
and put it equal to zero
and find Q

⇒ Sufficient Condition:-

Then find 2nd
derivative of profit function.

⇒ If (profit) 2nd derivative is
greater than zero then profit
will minimum.

⇒ If 2nd derivative is less
than zero then profit will max.

⇒ Then put value of Q in
eq ① and get value of π .

⇒ If govt. imposes Tax then

$$\Rightarrow \pi = TR - TC - T$$

And then follow above steps
to find profit.

⇒ If government provides Subsidy

then

$$\Rightarrow \pi = TR - TC + S$$

And then again follow above
steps to find Profit.