Answer on question #60146-Economics – microeconomics

Given demand function; P=570-0.3Q
a) Find total revenue
b) Revenue function
c) Marginal revenue at the output of 30units
d) quantity that maximise the total revenue
e) maximum total revenue

Solution

a)

The total revenue (TR) is calculated as output price (P) multiplied by the quantity (Q).

$$\mathbf{TR = \ Q * P}$$

b)

The function of revenue will be derivative from demand function.

$$TR\ (Q)\ = Q * P$$

Plug demand function to revenue formula:

$$\mathbf{TR\ (Q)\ = \ Q * (570 - 0.3Q)\ = \ 570Q - 0.3Q\text{\textasciicircum}2}$$

c)

The marginal revenue (MR) is the change in total revenue (TR) that results from selling 1 more unit of output (Q).

The marginal revenue will be derivative from revenue function

$$\frac{dTR}{dq} = 570 - 0.6Q = MR$$

Plug outputs of 30 units to the marginal revenue function

$$\mathbf{MR\ (30)\ = \ 570 - \ 0.6 * 30\ = 552}$$

d)

The total revenue will be maximized when marginal revenue equal zero.

$$MR\ = \ 0$$

$$570 - 0.6Q\ = \ 0$$

$$\mathbf{Q\ max\ = 950}$$

e)

The maximum revenue will be at the point where Q = Q $_{max}$

TR (Q max) = 570Q $-$ 0.3Q^2

TR (950) = 570*950 -0.3 *950^2

TR (950) = 270750

Answer
a) Total revenue
$$TR = Q * P$$

b) Revenue function
$$TR (Q) = 570Q - 0.3Q\text{^}2$$

c) The marginal revenue when outputs of 30units

$$MR (30) = 552$$

d) The level of outputs when total revenue is maximized
$$Q\ max = 950$$

e) The maximum total revenue

$$TR (950) = 270750$$