

Assignment 2

AI1110

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The marginal cost function of x units of a product is given by $MC = 3x^2 - 10x + 3$. The cost of producing one unit is ₹7. Find the total cost function and average cost function.

SOLUTION

Let us denote marginal cost function by $M(x)$, cost function by $C(x)$ and average cost function by $A(x)$.

Symbol	Formula	Definition
$M(x)$	$3x^2 - 10x + 3$	Additional cost per unit when units are incremented
$C(x)$	$\int M(x) dx$	Total expenses in terms of units
$A(x)$	$\frac{C(x)}{x}$	It is cost per unit

TABLE I

$$\text{Given, } M(x) = 3x^2 - 10x + 3 \quad (1)$$

$$\text{So, } C(x) = \int (3x^2 - 10x + 3) \cdot dx \quad (2)$$

$$C(x) = x^3 - 5x^2 + 3x + k \quad (3)$$

Where k is the constant of integration.

Also given $C(1) = 7$

$$\text{So, } 7 = 1 - 5 + 3 + k \quad (4)$$

$$k = 8 \quad (5)$$

Hence,

$$C(x) = x^3 - 5x^2 + 3x + 8 \quad (6)$$

$$A(x) = \frac{C(x)}{x} = x^2 - 5x + 3 + \frac{8}{x} \quad (7)$$