

# Assignment 2

## AI1110

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**Abstract**—This document contains the solution for Assignment 2 (ICSE Class 12 Maths 2019 Q.21(b))

**21(b)[2019 ICSE 12<sup>th</sup>]:** 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,

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

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