Question

Find the cost function for each marginal cost function.

46. $c'(x) = 0.2x^2 + 5x$; Fixed cost is $10

Solution

Marginal cost function is obtained by differentiating the total cost function. So you need to integrate the marginal cost function in order to get total cost function:

$$c(x) = \int (0.2x^2 + 5x)dx = \int 0.2x^2 dx + \int 5x dx = 0.2 \int x^2 dx + 5 \int x dx$$

$$= \frac{0.2x^3}{3} + \frac{5x^2}{2} + const$$

Fixed cost is value of $c(x)$ when nothing is produced, i.e. in point $x = 0$:

$$c(0) = const \Rightarrow const = 10 \Rightarrow c(x) = \frac{0.2x^3}{3} + \frac{5x^2}{2} + 10$$

Answer

Cost function for $c'(x) = 0.2x^2 + 5x$ with fixed cost of $10 is $c(x) = \frac{0.2x^3}{3} + \frac{5x^2}{2} + 10$.