Assignment 2

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Abstract—**This document contains the solution for Assignment 2 (ICSE Class 12 Maths 2019 Q.19(b))**

19(b) [ICSE 12 2019]:

The total cost function for a production is given by C(x) = $\frac{3}{4}x^2 - 7x + 27$. Find the number of units produced for which M.C = A.C. (M.C = Marginal Cost and A.C = Average Cost.)

Solution:

Given the Cost function for production is $C(x) = \frac{3}{4}x^2 - 7x + 27$, where x is the number of units sold.

We know that,

Average Cost Price (A.C) = $\frac{C(x)}{x}$,

Marginal Cost Price (M.C) = $\frac{d}{dx}C(x)$,

Where x is the number of units sold.

Here, we want the A.C to be equal to the M.C. Hence,

$$A.C = M.C \tag{1}$$

$$\frac{C(x)}{x} = \frac{d}{dx}C(x) \tag{2}$$

$$\frac{(\frac{3}{4}x^2 - 7x + 27)}{x} = \frac{d}{dx}(\frac{3}{4}x^2 - 7x + 27) \tag{3}$$

$$\frac{3}{4}x - 7 + \frac{27}{x} = \frac{3}{2}x - 7 \tag{4}$$

$$\frac{3}{4}x = \frac{27}{x} \tag{5}$$

$$x^2 = 36 \tag{6}$$

$$x = \sqrt{36} = 6. \tag{7}$$

Therefore, the number of units need to be sold for the Average cost to be equal to the Marginal cost is 6.
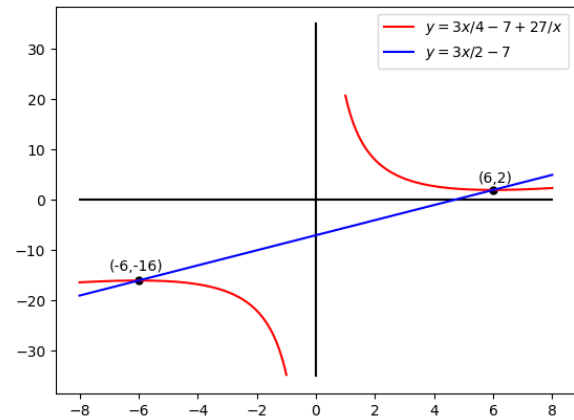

Fig. 1. Graph of Average cost and Marginal cost with respect to the number of units sold

As the number of units sold cannot be negative, the number of units sold are 6 from the graph.