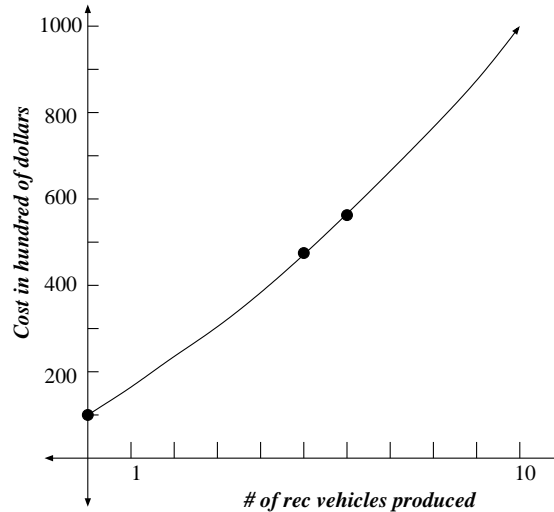


Math142 Lecture Notes

3.7 - Marginal Analysis in Business and Economics

The cost of producing q recreational vehicles can be modeled by $C(q) = 100 + 60q + 3q^2$ where q represents the number of vehicles produced and $C(q)$ is the cost in hundreds of dollars.



1. Find $C(6) - C(5)$ and interpret.
2. Find $C'(5)$, interpret, and compare it to the value found in question 1 above.

Marginal Business Functions: approximate change in the dependent variable (cost, revenue, profit, etc.) when the independent variable (# items produced/sold) is changed by a single unit.

- Marginal Cost Function $MC(x) = C'(x)$
- Marginal Revenue Function $MR(x) = R'(x)$
- Marginal Profit Function $MP(x) = P'(x)$
- Marginal Average Cost $MAC(x) = \frac{d}{dx} \left(\frac{C(x)}{x} \right) = \overline{C}'$
- Marginal Average Profit $MAP(x) = \frac{d}{dx} \left(\frac{P(x)}{x} \right) = \overline{P}'$

Marginal Cost and Exact Cost: If $C(x)$ is the total cost of producing x items, the marginal cost function, $C'(x)$, **approximates** the exact cost of producing the $(x+1)^{st}$ item. In other words, it represents the cost of producing the next item.

Example 1: If a company's cost function is given by $C(x) = \frac{x^2}{100} + \frac{x}{2} + 8$ and its price-demand function is given by $p(x) = -\frac{x}{200} + 1$.

(a) Find $R(x)$ and $P(x)$.

(b) Find

1. $MP(x)$ or P'

2. $MC(x)$ or C'

3. $MR(x)$ or R'

4. $MAC(x)$ or \overline{C}'

5. $MAP(x)$ or \overline{P}'

(c) Evaluate and interpret

• $C(20)$ and $MC(20)$

• $AC(10)$ and $MAC(10)$

