

Applications of the Derivative

Part 1: Business Applications

Example 1: If the cost in dollars to produce x items is given by $C(x) = 50 + 48x + x^3$, find the marginal cost function $\overline{MC}(x)$.

Example 2: Suppose that the cost function for a commodity is $C(x) = 300 + 6x + \frac{1}{20}x^2$.

a.) Find and interpret $\overline{MC}(8)$.

b.) Find and interpret $C(9) - C(8)$.

Example 3: Suppose that the total revenue function for a commodity is

$$R(x) = 36x - 0.01x^2.$$

a.) Find and interpret $R(100)$

b.) Find and interpret $\overline{MR}(100)$

c.) Find and interpret $R(101) - R(100)$

Example 4: If the profit from the sale of x items is given by

$$P(x) = 16x - 0.1x^2 - 100$$

a.) Graph $\overline{MP}(x)$

b.) What level of production and sales will give a marginal profit of zero?

c.) At what level of production is the profit maximized?

Example 5: If the daily of cost per unit associated with producing a product by the Caterpillar (CAT) Corp is $10 + 2x$ and if the price for each unit is \$50 on the competitive market, what is the maximum daily profit that can be expected from this product?