Section 9.9

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 $\overline{\text{MC}}(x)$.

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

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

b.) Find and interpret $C(8) - C(7)$.

Example 3: Suppose that the total revenue function for a commodity is $R(x) = 36\,x - 0.01\,x^2$ (in dollars).
a.) Find and interpret $R(100)$

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

c.) Find and interpret $R(100) - R(99)$

Example 4: If the profit from the sale of x items is given by $P(x) = 16\,x - 0.1\,x^2 - 100$

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

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?