Definitions and Basic facts

1. Cost function: the cost of producing $x$ units of a certain product; Denoted by $C(x)$.

2. Marginal cost: the rate of change of the cost with respect to $x$.

3. Demand function: the function which gives the price per unit that the company can charge if it sells $x$ units; denoted by $p(x)$.

4. Revenue function: $R(x) = xp(x)$.

5. Profit function: $P(x) = R(x) - C(x)$.

Sample Problems

1. For the cost function $C(x) = 680 + 4x + 0.01x^2$, and demand function $p(x) = 12 - \frac{x}{500}$ find the production level that will maximize profit.
2. During the summer months Terry makes and sells necklaces on the beach. Last summer he sold the necklaces for $10 each and his sales averaged 20 per day. When he increased the price by $1, he found that he lost two sales per day.

(a) Find the demand function, assuming that it is linear.

(b) If the material for each necklace costs Terry $6, what should the selling price be to maximize his profit?

3. An automobile dealer can sell four cars per day at a price of $12,000. He estimates that for each $200 price reduction he can sell two more cars per day. If each car costs him $10,000, and his fixed costs are $1,000, what price should he charge to maximize his profit? How many cars will he sell at this price?