Business Application Functions

(I) Demand Function: (AKA: price demand function; demand equation)

Meaning: Relates demand for a product (i.e., # of units sold) to the price charged per unit.

Example/Graph:

\[ p = 200 - \frac{x}{10} \]

(II) Revenue Function:

Meaning: Relates the revenue generated from selling a product to either the price charged, \( R(p) \), or the demand (# of units sold), \( R(x) \).

Key concept to remember: Revenue = price charged \( \times \) # of units sold

Therefore, \( R(x) \) and \( R(p) \) can be derived from the demand equation as follows: \( R = \text{price} \times \text{units sold} = p \times x \).

Example/Graph:

\[ R = p \times x = (200 - x/10) \times x \]

Therefore, \( R(x) = 200 \times x - 0.1 \times x^2 \)

Multivariable case: Suppose \( x, p \) = demand & price for Item 1, and \( y, q \) = demand & price for Item 2.

Then, total revenue: \( R = x \times p + y \times q \)
(III) **Cost Function:**

**Meaning:** Relates the total cost of producing a commodity, to the number of units produced, $C(x)$.

**Example/Graph:**

$$C(x) = 1000 + 20x$$

(IV) **Profit Function:**

**Meaning:** Relates the total profit from producing and selling a commodity, to the number of units produced/sold, $P(x)$.

**Key concept to remember:** Profit = Revenue - Cost

Therefore, if we know the revenue and cost function, we can always find the profit function.

**Example/Graph:**

$$P(x) = R(x) - C(x)$$

$$P(x) = -0.1x^2 + 180x - 1000$$