Revenue, Cost, Profit

We let the variable $q$ denote the demand, or the number of units sold and $p$ denote the price charged per unit. Note that the variables $p$ and $q$ are, generally, related. As the price goes up, we expect the demand (or more accurately, the quantity demanded), $q$ to go down.

We define the revenue function, $R$, as $R(q) = pq$. $R$ represents the total amount of money that comes in through sales. The relationship between the variables $q$ and $p$ alluded to above is essential to representing the revenue as a function of $q$ alone. It will be given to you within the problem.

The cost function, $C$, is defined by $C(q) = \text{fixed costs} + \text{variable costs}$. The fixed costs represent costs associated to production which are constant, irrespective of the number of units sold (such as rental of the warehouse where units are stored). The fixed cost will vary depending on the problem. The variable costs represent costs which scale with the number of units produced - for instance, the costs incurred in buying the raw materials needed for manufacture. The variable cost function will be given to you in the problem. In many of our examples, it will be linear (as a function of $q$). The cost function $C(p)$ then represents the total amount of money spent to produce $q$ units.

The profit function $P$ is defined by $P(q) = R(q) - C(q)$, the difference between the total amount of money brought in by the production of $q$ units, and the total spent to produce those units.