Cost, Revenue and Profit

The profit is the difference between the revenue (sales) and the cost, if x units are produced and sold, we can write the following:

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

Where: $P(x)$ = profit from sale of x units. $R(x)$ = revenue from sale of x units
              $C(x)$ = cost of production and sale of x units

> **Revenue = (price per unit)(number of units)= $p.q$**

The cost is composed of two parts, fixed costs and variable costs:
- **Fixed costs** such as rent, utilities... remain constant regardless of the number of units produced.
- **Variable costs** are those directly related to the number of units produced.

In general: **Cost** = Variable costs + fixed costs
- **Break-Even Point:** the point where revenue equals cost $R(x) = C(x)$.

EX.1) Suppose a firm manufactures radios and sells them for $50 each. If the costs incurred in the production and sale of the radios are $200,000 plus $10 for each radio produced and sold.
   a) Write the profit function for the production and sale of x radios.
   b) Graph the revenue, cost and profit equation on one graph.
   c) Find the marginal cost, marginal revenue, marginal profit.
   d) Find the break-even point.
   Answer: a) $p = 40q - 200,000$ ***b)***   ***c)*** *10, 50, 40*   ***d)*** $x = 5000$ *units*
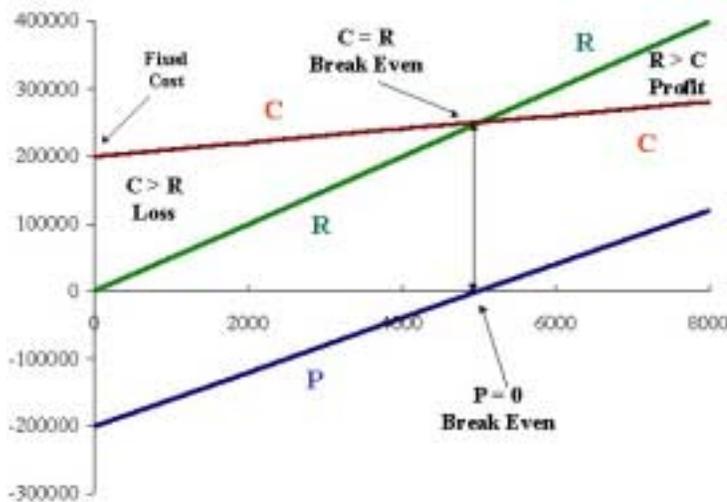
EX.2) The average weekly for durable goods in the United States economy in 1967 was $25 billion. by 1982 this average had increased to $70 billion.
   a) Use these data to find the linear equation.
   b) What level of average weekly orders does this model predict for the 1987?
       Answer: a) $y = 3t + 25$ ***b)*** *85 billion dollars*

Demand and Supply

The manufacturer of a product is free to set any price **p** for each unit of the product. Of course, if the price is too high, not enough people will buy the product; if the price is too low, so many people will rush to buy the product that the manufacturer will not be able to satisfy demand. Thus, in setting price, the manufacturer must take into consideration the demand for the product.

Let **S** be the number of units that the manufacturers are willing to supply at the price **p; S** is called the **Supply**. Generally, the value of S will increase as p increases; that is, the manufacturers are willing to supply more of the product as the price p increases.

Let **D** be the number of units of the product that consumers are willing to buy at the price p; **D** is called the **Demand**. Generally, the value of D will decrease as p increases; that is, the consumers are willing to buy fewer units of the product as the price rises.

> **Law of supply:** the quantity supplied for sale will increase as the price of the product increases where:
>   **p = S(x)**   the supply function; price per unit at which the supplier will supply x units of an item. (*positive slope, rising line*)
>
> **Law of demand**: the quantity demanded will increase as the price of the product decreases where:
>   **p = D(x)**   the demand function; price per unit at which consumers will buy x units of an item. (*negative slope, falling line*)
>
> **Market equilibrium**: the price at which supply S and demand D are equal. At this price, every unit that is supplied is purchased. If the product is sold for more than the equilibrium price, there will be an unsold **surplus** on the market and retailer will tend to lower their prices. On the other hand, if the product is sold for less than the equilibrium price, the demand will exceed the supply which causes a **shortage** and retailers will be inclined to raise their prices.
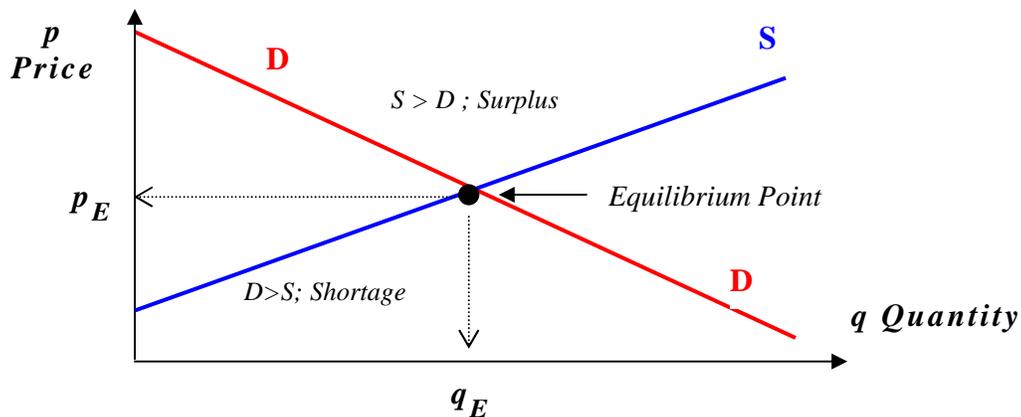
| Equilibrium Point is when Demand = Supply |
|:---:|
| Or D = S |

EX.3) Suppose that S and D are the related price p as follows:

$$S = 2p + 3$$
$$D = -p + 12$$

Find the equilibrium price

By making $D = S$ or
2p + 3 = -p + 12,
you will find that the price p is $3, Substitute this
price in the demand or the supply equation and you
will find that the number of units is 9 units.
Graph the two equations by making
the y-axis as the price p,
the x axis as the quantity q.

Eq. Point

(9units, $3)

S

D

p

q
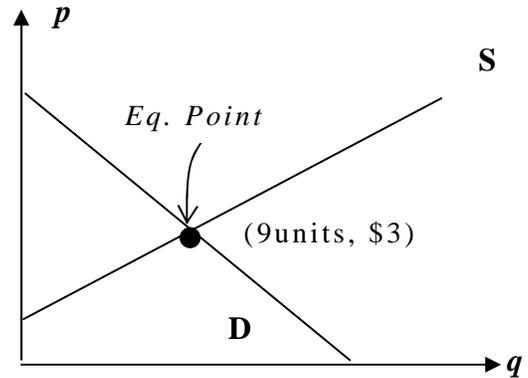
Ex.4) One of the following tables represents supply curve and the other represents demand curve:

Quantity	q	15	22	35	45
Price A	p	8	10	14	18
Price B	p	16	14	10	6

a) Which price represents the Demand and which represents the Supply?

b) At a price of $10, how many items would the consumers purchase? _____

c) At a price of $10, how many items would the manufactures supply? _____

d) What happens when the price is $10? Shortage or Surplus?

Ex.5) The following figure shows the supply and demand curves for a particular product:

a) What is the equilibrium point

b) How many items will be supplied and demanded
when the price is $6? should the price increases
or decreases and why?

c) How many items will be supplied and demanded
when the price is $10? should the price increases
or decreases and why

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