



BUSINESS CALCULUS

GENERAL FORMULAS

COST: $C(x) = (\text{fixed cost}) + (\text{variable cost})$

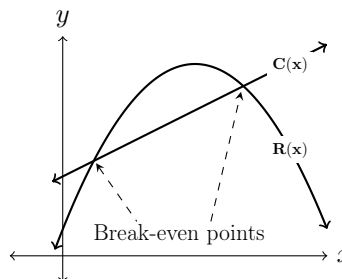
PRICE-DEMAND: $p = -ax + b$.
 x is the number of items that can be sold at $\$p$ per item.

REVENUE: $R(x) = x * p = \text{Demand} * (\text{Price demand})$

PROFIT: $P(x) = R(x) - C(x) = \text{Revenue} - \text{Cost}$

BREAK-EVEN POINT: $C(x) = R(x)$

The intersection between the graphs $C(x)$ and $R(x)$.



AVERAGE KEYWORD	MARGINAL KEYWORD
The average is obtained by dividing by demand x .	Marginal means derivative.

AVERAGE COST: $\bar{C}(x) = \frac{C(x)}{x}$

MARGINAL COST: $C'(x) = \frac{d}{dx}(C(x))$

AVERAGE REVENUE: $\bar{R}(x) = \frac{R(x)}{x}$

MARGINAL REVENUE: $R'(x) = \frac{d}{dx}(R(x))$

AVERAGE PROFIT: $\bar{P}(x) = \frac{P(x)}{x}$

MARGINAL PROFIT: $P'(x) = \frac{d}{dx}(P(x))$

AVERAGE MARGINAL COST: $\bar{C}'(x) = \frac{\frac{d}{dx}(C(x))}{x}$

MARGINAL AVERAGE COST: $\bar{C}'(x) = \frac{d}{dx}\left(\frac{C(x)}{x}\right)$

AVERAGE MARGINAL REVENUE: $\bar{R}'(x) = \frac{\frac{d}{dx}(R(x))}{x}$

MARGINAL AVERAGE REVENUE: $\bar{R}'(x) = \frac{d}{dx}\left(\frac{R(x)}{x}\right)$

COMPOUND INTEREST

If a **principal P** is invested at an **annual rate r** (in decimal) **compounded continuously**, then the amount **A** in the account after **t years** is given by

$$A = P \cdot e^{r \cdot t}$$

If a **principal P** is invested at an **annual rate r** (in decimal) **compounded n times per year**, then the amount **A** in the account after **t years** is given by

$$A = P \cdot \left(1 + \frac{r}{n}\right)^{n \cdot t}$$





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ELASTICITY OF DEMAND

If the equation $x = f(p)$ is the equation obtained after solving the price-demand equation for demand x , then the **elasticity of demand** is given by

$$E(p) = -\frac{p \cdot f'(p)}{f(p)}$$

TYPES OF DEMAND

$E(p)$	DEMAND	INTERPRETATION
$0 < E(p) < 1$	Inelastic	Demand is not sensitive to changes in price.
$E(p) > 1$	Elastic	Demand is sensitive to changes in price.
$E(p) = 1$	Unit	A percentage change in price produces the same percentage change in demand.

GINI INDEX

If $y = f(x)$ is the equation of a Loretz curve, then

$$\text{Gini Index} = \int_0^1 [x - f(x)] \cdot dx$$

The Gini Index is a number between 0 and 1.

CONSUMERS' SURPLUS

If (\bar{x}, \bar{p}) is a point on the graph of the price-demand equation $p = D(x)$ for a particular product, then the **consumers' surplus** at a price level of \bar{p} is

$$CS = \int_0^{\bar{x}} [D(x) - \bar{p}] \cdot dx$$

PRODUCERS' SURPLUS

If (\bar{x}, \bar{p}) is a point on the graph of the price-supply equation $p = S(x)$ for a particular product, then the **producers' surplus** at a price level of \bar{p} is

$$PS = \int_0^{\bar{x}} [\bar{p} - S(x)] \cdot dx$$

