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# Microeconomics

## Production Function

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# Production Function

Process through which a firm transforms inputs into output.

-Factors of production

$$Q = f(L, K, T)$$

## Fixed factors vs Variable factors

Variable factors refers to those factors which can be changed in the short run. they can vary with output.

E.g. raw material, labour, power, fuel, etc



# Production Function

$$Q_x = f(L, K)$$

Where,

$Q_x$  is the quantity of output of commodity  $x$ ,  
 $f$  is the function,

$L$  and  $K$  are the units of labour and capital





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# Short run vs Long Run

Factors are classified as variable and fixed factor in the short run.

**Short run :**

Output can be changed by changing variable factors.

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# Total Product, Average Product & Marginal Product

## Total Product:

Total quantity of goods produced by a firm during a given period of time with a given number of input.

## Average product:

Output per unit of variable unit input.

## Marginal product:

Addition to total product when one more unit of variable factor is employed.



# Law of Variable Proportions

“As we increase quantity of only one input keeping other inputs fixed total product initially increases at an increasing rate then at a decreasing rate and finally at a negative rate.”



# LVP

Variable factor	Total Product
1	10
2	30
3	45
4	52
5	52
6	48

Derive the Average Product and the Marginal product



Variable factor	Total Product	Marginal Product	Phase
1	10	10	Phase I Increasing Returns to Scale
2	30	20	
3	45	15	Phase II Decreasing Returns to Scale
4	52	7	
5	52	0	
6	48	-4	Phase III Negative Returns to Scale

