Probability:-

"Probability is the numerical evaluation of the chance that a particular event could occur." Probability theory was introduced by two French Mathematicians "Blaise Pascal" and "Pierre De Fermat."

Random Experiment:-

A well defined action is called random experiment.

Sample Space:-

The set of all the possible out comes of random experiment is called Sample Space and denoted by "S."

Event:-

A subset of sample space is called event.

* Membess of Sample Space are called sample points or out Comes.

Complementary Event:-

Let "A" be an event of a sample Space S then $\overline{A}$ is called Complementary event of "A" and contains all those sample points which are not in "A".

Equally Likely Event:-

"Two events "A" and "B" are called equally likely events if they have same number of elements" i.e. $n(A)=n(B)$

Simple (Elementry) Event:-

"An event containing just one sample point is called simple event.

Compound Event:- "An event which can be decomposed into simple events is called Compound Event."

Sure Event:-

"An event whose chance of occurence is 100% and contains all the points of sample space is called Sure Event."

Impossible Event:-

"An event whose chance of occurence is 0% and it does not contain any point of sample space called impossibe event."

Mutually Exhaustive Event:-

Two events "A" and "B" are called Mutually exhaustive if $A \cup B = S$ (Sample Space).

Mutually Exclusive Event:-

"Two events "A" and "B" are called Mutually Exclusive if $A \cap B = \phi$."

Probability:-

Let "A" be an event containing "m" elements and S sample space contains "n" elements then Probability is defined as $P(A) = \frac{n(A)}{n(S)} = \frac{m}{n}$ (Laplacian Defination)

Important Points:-

* $P(\bar{A}) = 1 - P(A)$.
(ii) $P(A) = 0$ if $A = \phi$
(iii) $0 \leq P(A) \leq 1$ $A \in S$
(iv) Probability of Sure event is 1
(v) Probability of impossible event is Zero.
(vi) $P(A) \geq 0$ for any Event A.
(vii) Compound Event is a union of simple Events.
(viii) $P(A) = 1$ if $A = S$
(ix) Number of Elements in the event is called Size of Event.

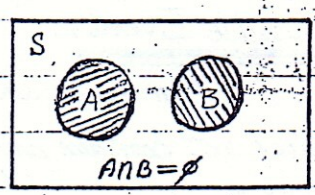
Addition Laws of Probability:-

(i) A and B are Mutully exclusive Events:-

Let "A" and "B" are two (disjoint) Mutually Exclusive Events then

$A \cap B = \phi$

$\Rightarrow P(A \cup B) = P(A) + P(B)$.

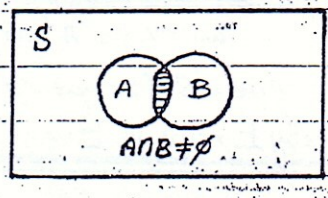


(ii) A and B are non mutually Exclusive:-

Let "A" and "B" are two non-mutually exclusive events then

$A \cap B \neq \phi$ so

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$.



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Dependent Events:-

Two events A and B are called dependent Events if occurence of A or B depends upon the occurence of B or A respectively.

Independent Events:-

Two events A and B are called independent if occurence of A or B does not affected by the occurence of B or A respectively.

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Multiplication Law of Probability:-

Let A and B are two independent events then

$P(A \cap B) = P(A) \cdot P(B)$

Generalization:- Let $A_1, A_2, A_3, \cdots, A_n$ are independent events then $P(A_1 \cap A_2 \cap A_3 \cap \cdots \cap A_n) = P(A_1) \cdot P(A_2) \cdot P(A_3) \cdot \cdots \cdot P(A_n)$.