

→ It is the branch of mathematics which deal about the numerically the chance of occurrence of events.

It be used different fields, Gambling, Insurance, Economics, Theoretical Physics and many other fields.

$$P(E) = \frac{n(E)}{n(S)}$$

Ex-1 - A Coin be tossed then the probability for head = $\frac{1}{2}$ and Tail = $\frac{1}{2}$

Ex-2 In 52 Play Card of single queen draw of Probability

$$= \left[\frac{1}{52} \right]$$

∴ Prob = $\frac{\text{Favorable event}}{\text{Total Nos of equally likely event}}$

Here Fav event = 1 Total = 52

Random Experiment - There are

experiments, in which results may be altogether different, even though they are performed under identical conditions. They are known as random experiments,

Tossing a coin or Throwing a die is random experiment.

- (a) Tossing a coin (b) Tossing two coins simultaneously
 (c) Tossing a coin three times
 (d) Throwing a die
 (e) Drawing a card from a pack of 52 (Playing) cards. (All these are random experiments)

Sample Space :- The set of all possible outcomes of the experiment is called sample space.

It is denoted by 'S' and its number of elements $n(S)$ or Ω

Ex: - I If we throw a die then the number that appears only one i.e. 1, 2, 3, 4, 5, 6

$$S = \{1, 2, 3, 4, 5, 6\} \text{ and } n(S) = 6$$

II If a coin be tossed either Head or Tail will appear so ~~etc~~

$$\text{Here } S = H, T$$

$$n(S) = 2.$$

III If two cards out of 52 then the No of sample space $= n(S) = 52$

ie 2 cards can be selected from 52 cards $= {}^{52}C_2$

Sample space may be finite or infinite

Event :- Every subset of a sample space is called event. It is denoted by 'E'

Ex: - In tossing two coins together

$$S = \{(H, H), (H, T), (T, H), (T, T)\}$$

$$\text{Here } n(S) = 4$$

So the No of ~~subset~~ subset $= 2^4$
 $= 16$

II For single

$$S = \{H, T\}$$

$$\text{subset} = 2^2 = 4$$

[किसी प्रयोग के विभिन्न परिणामों को व्यक्त करने के लिए]

There are three types of events

(i) Simple event: only one event be occurring a time is called simple event.

(ii) Compound event: Two or more than two events are occur of a time is called compound event.

Ex! → When we throw dice, then any one of the number from 1 to 6 may come up.

$$\therefore S = \{1, 2, 3, 4, 5, 6\}$$

the appearance of a single No. $s = 1, 2, 3, 4, 5, 6$ will be an elementary event.

If the number 2 appears on the top face, then it is a simple event which is denoted by $\{2\}$ similarly $\{5\}$ & $\{6\}$ also represent simple event.

II When two coins are tossed the sample

$$\text{space } S = \{HH, HT, TH, TT\}$$

then are four simple events. Corresponding to this sample space

$$\text{these are } E_1 = \{H, H\} \quad E_2 = \{H, T\} \quad E_3 = \{T, H\}$$

$$\& \quad E_4 = \{T, T\}$$

Ex: - Mixed / Compound / Composite
 In Tossing three coins.

$E =$ Exactly one head appeared $\Rightarrow \{HTT, THT, TTH\}$

$E_2 =$ almost one head $\Rightarrow \{HTT, THT, TTH, TTT\}$

Important Event.

Equiprobable Event: - equally likely Event
 If there is chance of happening of some
 certain event said to be equally likely
 if none of them expected to occur in
 preference to other.

Ex: - Getting H & T in one coin

$\{1, 2, 3, 4, 5, 6\} \rightarrow$ occurrence of any
 No. on throw of a die

Occurrence of an even & odd in

die is equip.

Independent Event

If occurrence of one does not depend (effect)
 on occurrence of the other

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

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

Ex: - $S = \{1, 2, 3, 4, 5, 6\}$

$E_1 = \{1, 3, 5\} =$ odd No. $\Rightarrow E_1$ & E_2 are

$E_2 = \{2, 4, 6\} =$ even No. Independent
Event.