

Experimental Probability

Experimental probability can be applied to any event associated with an experiment that is repeated a large number of times.

A trial is when the experiment is performed once. It is also known as empirical

probability. Experimental or empirical

probability: $P(E) = \frac{\text{Number of trials where the event occurred}}{\text{Total Number of Trials}}$

Theoretical Probability

Theoretical Probability, $P(E) = \frac{\text{Number of Outcomes Favourable to } E}{\text{Number of all possible outcomes of the experiment}}$

Here we assume that the outcomes of the experiment are equally likely.

Probability

If an experiment has

Total no. of outcomes : $(m+n)$

'm' outcomes are in favour of an event 'A'

that is repeated a large number of times.

MINDMAP

Probability

'n' outcomes are not in favour of the event 'A'

Then,

The probability of occurrence of the event 'A' is defined by :

$P(A) = \frac{m}{m+n}$

$= \frac{\text{No. of favourable out comes}}{\text{Total no. of out comes}}$

If $P(A) = 0$ Event is impossible

$P(A) = 1$ Event is sure $(0 \leq P(A) \leq 1)$

Note:

(i) More is the probability of an event, more are chances of its happening.

(ii) $P(\phi) = 0$ & $P(S) = 1$

i.e. nothing outside sample space can occur.

(iii) Probability of non-occurrence of A ,

$P(\bar{A})$ or $P(A')$ or $P(A^c) = \frac{n}{m+n}$

$= 1 - P(A)$

Random Experiments

An experiment is called random experiment if

(i) It has more than one possible outcomes.

(ii) It is not possible to predict the outcome in advance.

Each performance of the random experiment is called a trial.

Outcomes And Sample Space

A possible result of a random experiment is called its outcome.

And the set of all possible outcomes of a random experiment is called the sample space associated with it (denoted by S).

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Note:

- (1) Each element of the sample space is called a sample point.

OR

Each outcome of the random experiment is also called sample point.

- (2) A sample space having finite number of sample points, is called "Discrete sample space"

Event

Occurrence of particular outcomes of an experiment under a situation is known as an event.

MIND MAP

Probability

In other words any subset E of a sample space S is called an event.

Note:

The maximum number of events which can be associated with an experiment is 2^n , where n is the number of elements in the sample space.

Impossible and Sure Events

Experiment : Rolling a die

Sample Space : Set of outcomes :

{1, 2, 3, 4, 5, 6}

Event 'E' : The no. appearing on the die is 7" = ϕ

- ❖ ϕ is called an Impossible Event .

Event 'F' : The number turns up is odd
or even. = S

S, i.e., the whole sample space is called the Sure Event.

Simple Event

If an event E has only one sample point of a sample space, it is called a simple (or elementary) event.

- ❖ Which cannot be further split.

In a sample space containing n distinct elements, there are exactly n simple events.

Compound Event

If an event has more than one sample point, it is called a compound event.

Equally Likely Events

Events are said to be equally likely when no particular event have preference to occur in relation to the other event.

Note:

Events which are equally likely are also known as "Equiprobable".