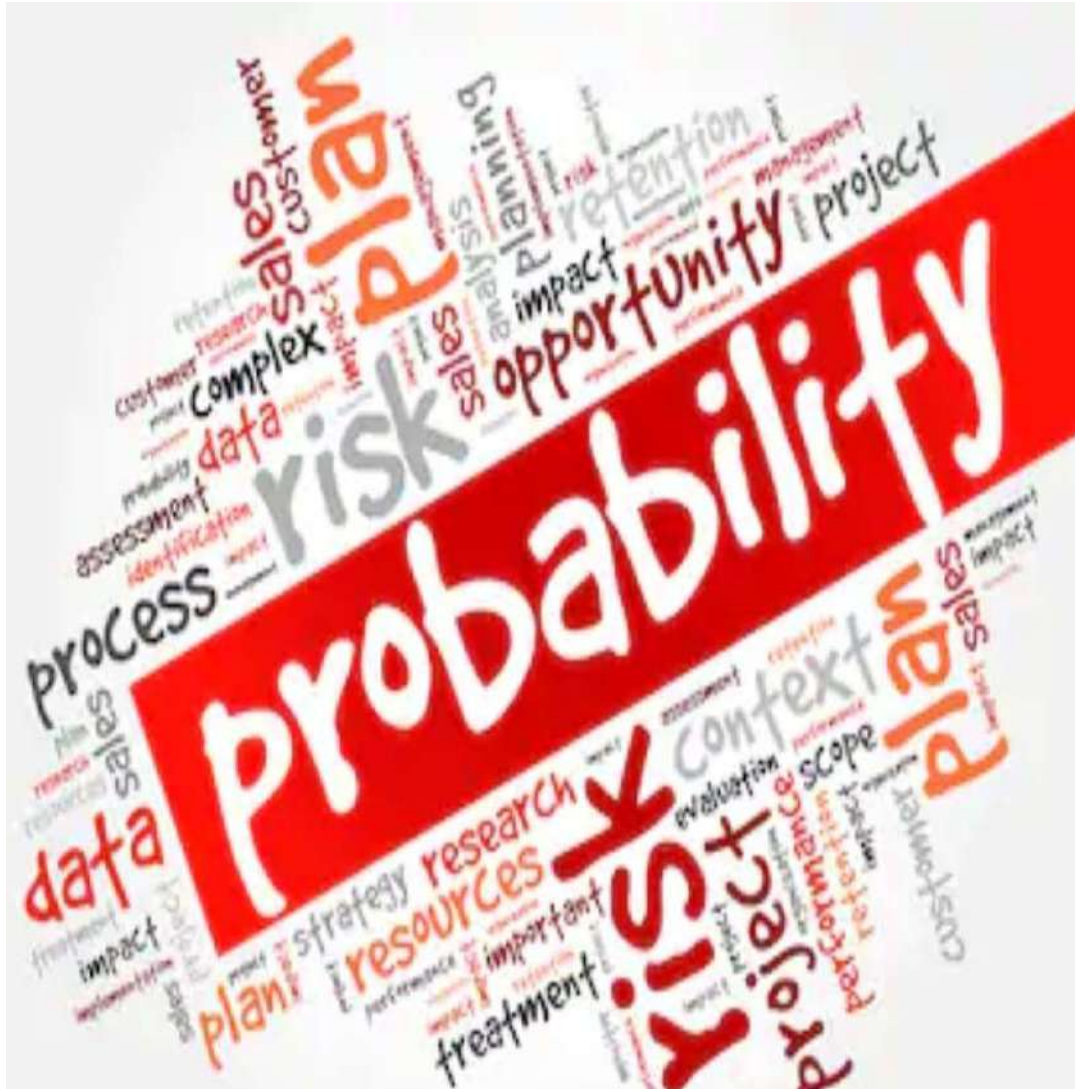


PROBABILITY



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Introduction:

In everyday life, we come across statements such as

- (1) It will probably rain today.
- (2) I doubt that he will pass the test.
- (3) Most probably, Kavita will stand first in the an
- (4) There is a 50-50 chance of India winning a toss





The concept of probability developed in a very strange manner. In 1654, a gambler Chevalier de Mere, approached the well-known 17th century French philosopher and mathematician Blaise Pascal regarding certain dice problems. Pascal became interested in these problems, studied them and discussed them with another French mathematician, Pierre de Fermat. Both Pascal and Fermat solved the problems independently. This work was the beginning of Probability Theory.



Blaise Pascal
(1623–1662)



Pierre de Fermat
(1601–1665)

WHAT IS PROBABILITY ?

- ▶ PROBABILITY IS THE MEASURE OF VARIOUS PHENOMENON, NUMERICALLY



In probability we frequently use the term ‘experiment’.

There are two types of experiments:

- (i) Deterministic experiment
- (ii) Random experiment

(i) Deterministic experiments- The experiments which have only one possible result .

Ex- an experiment that the Sun rises from the east.

(ii) Random experiments - An experiment whose result is uncertain

(an experiment whose all the outcomes are known but whose exact outcome is unknown).

Ex- an experiment conducted to toss a coin

TRIAL :

A trial is an action which results in one or several outcomes.

example- When we toss a coin the work of tossing a coin is a trial

OUTCOMES :

All the possible results of an experiment are known as outcomes

Example - when we toss a coin outcomes are head and tail

EVENT:

An event is the collection of outcomes of an experiment to which a probability is assigned.

Ex- when we throw a die outcomes are 1,2,3,4,5,6

There are many events- an event of getting an even number

- An event of getting an odd number

- an event of getting a number less than 4

IMPOSSIBLE AND SURE EVENTS :

The probability of an impossible event is 0 and the probability of a sure event is 1

▶ Equally likely events:

- ▶ **equally likely events are the events that have the same theoretical probability of occurring.**
- ▶ **Each numeral on a dice is equally likely to occur when the dice is tossed.**

SAMPLE SPACE:

The collection of all possible outcomes of a random experiment is called the sample space associated with the experiment .

Ex- 1) When we throw a dice

Sample space= { 1, 2, 3, 4, 5, 6 }

2) When we toss two coins together

Sample space = { HH,HT,TH,TT }

$$P(E) = \frac{\text{Number of trials in which the event happened}}{\text{The total number of trials}}$$

Example 1 : A coin is tossed 1000 times with the following frequencies:

Head : 455, Tail : 545

Compute the probability for each event.

Solution : the total number of trials is 1000.

$$P(\text{HEAD}) = \frac{455}{1000} = 0.455$$

$$P(\text{TAIL}) = \frac{545}{1000} = 0.545$$

$$P(E) = \frac{\text{NUMBER OF TRIALS INWHICH THE EVENT HAPPENED}}{\text{THE TOTAL NUMBER OF TRIALS}}$$

Ex 2 : Find the probability of getting a head when a coin is tossed once. Also find the probability of getting a tail.

Sol: Sample space = { H , T }

$$P(\text{Head})=1/2$$

$$P(\text{Tail})=1/2$$

Example 3

- A coin is tossed 100 times and the outcomes are recorded. The frequency distribution of the outcomes H(i.e. head) and T (i.e. tail) is given below:

OUTCOME	HEAD	TAIL
FREQUENCY	25	75

Find the probability of getting a head in a single trial.

Solution:

$$\begin{aligned}\text{Probability of getting a head} &= \frac{\text{number of outcomes favourable to } E}{\text{total number of outcomes}} \\ &= \frac{25}{100} = 0.25\end{aligned}$$

Example 4

- ▶ There are 40 students in a class and their results is presented as below of a student chosen at random out of the class , find the probability that ths student has passed the examination.

RESULT(PASS/FAIL)	PASS	FAIL
NUMBER OF STUDENTS	30	10

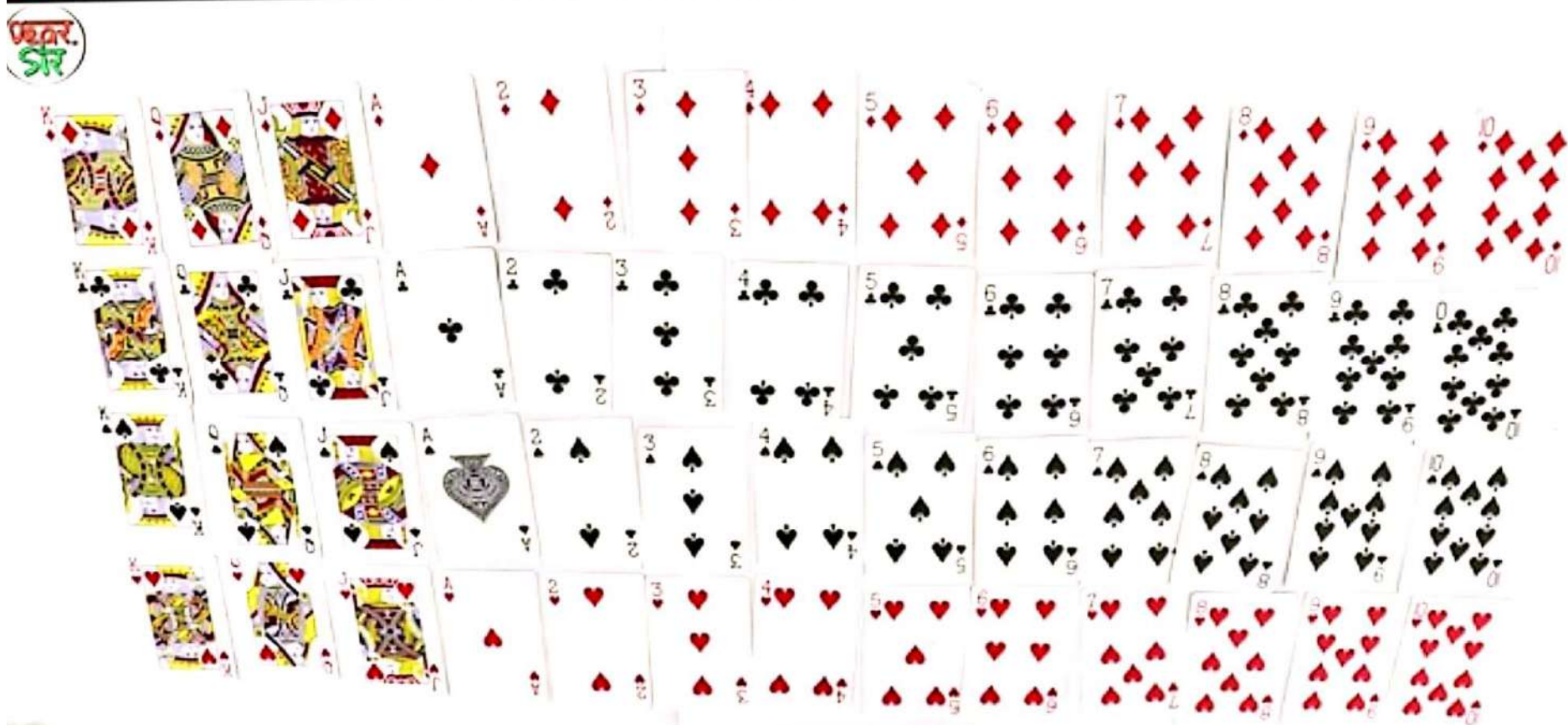
- ▶
$$P(\text{pass}) = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$$

$$= \frac{30}{40} = \frac{3}{4} = 0.75$$

PISA RELATED QUESTION

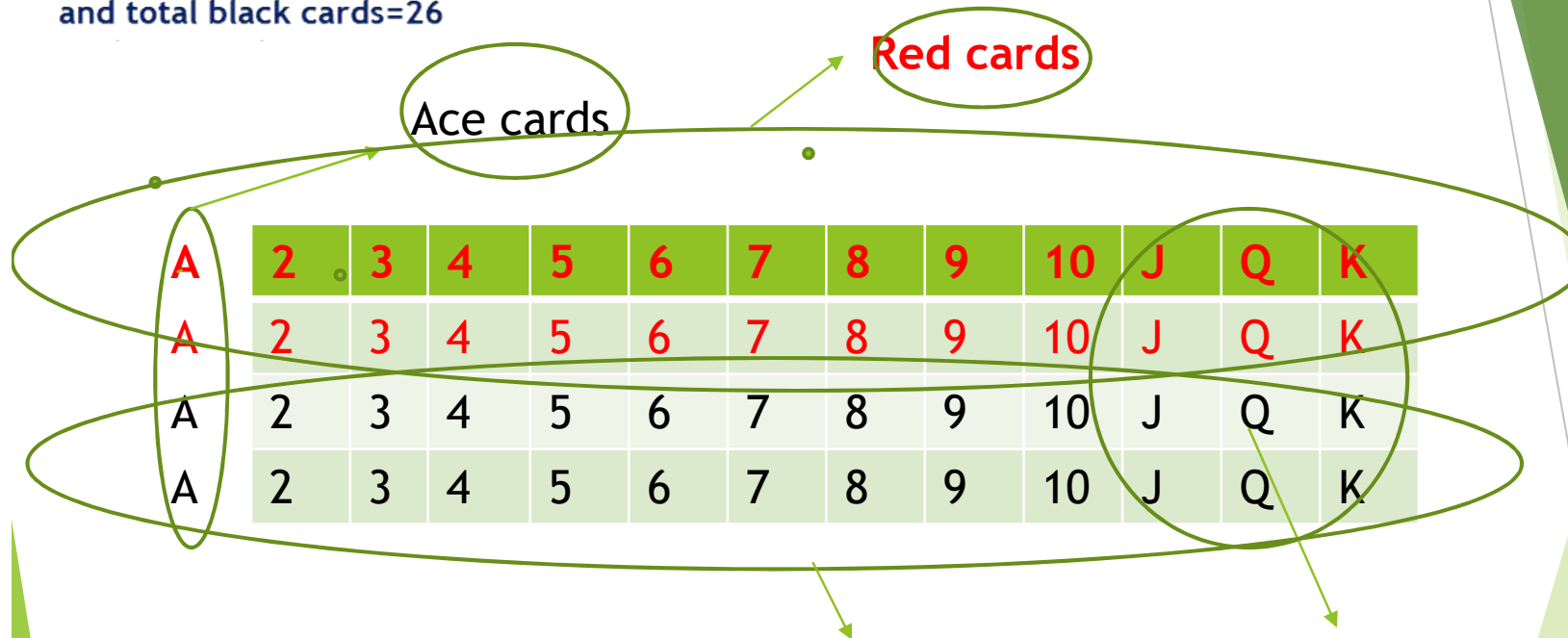
From a
well shuffled pack of 52 playing cards one card is drawn at random, find
the probability of getting

- (a) a black card
- (b) a red face card
- (c) an ace card
- (d) a black card with a number 10



Solution:

there are total 52 playing cards
out of which total red cards=26
and total black cards=26



$$P(\text{black cards}) = 26/52$$

$$P(\text{red face card}) = 6/52$$

$$P(\text{an ace card}) = 4/52$$

HOME WORK

- 1) A coin is tossed 500 times and we get
Heads : 285 times and tails : 215 times .
When a coin is tossed at random , what is the probability of getting
(i) a head? (ii) a tail
- 2) In a survey of 200 ladies , it was found that 142 like coffee , 58 dislike it.
Find the probability that a lady chosen at random
(i) Likes coffee , (ii)dislikes coffee
- 3) In a cricket match , a batsman hits a boundary 6 times out of 30 balls he plays . Find
the probability that he did not hit a boundary
- 4) A bag contains 5 red, 8 black , and 7 white balls . one ball is chosen at random .
What is the probability that the chosen ball is black ?
- 5) It is known that a box of 800 electric bulbs contains 36 defective bulbs. One bulb is
taken at random out of the box. What is the probability that the chosen bulb is non
defective .

That was all for the chapter of probability hope you got a nice learning experience from my presentation

THANK YOU