

# Probability

## A Theoretical Approach

Here, we try to predict what will happen without actually performing the experiment. We assume that the outcomes of an experiment are equally likely. We find that the experimental probability of an event approaches its theoretical probability if the number of trials of an experiment is very large.

## Random Experiment

When an experiment is repeated several times the result may not be the same. These repetitions are called trials.

The theoretical probability (classical probability) of an event 'E' written as  $P(E)$  is defined as,  $P(E)$

$$= \frac{\text{Number of out comes favourable to } E}{\text{Number of all possible out comes of the experiment}}$$

## Compound Event

An event connected to a random experiment is a compound event if it is obtained by combining two or more elementary events connected to the random experiment.

## Occurrence of an event

An event corresponding to a random experiment is said to occur if any one of the elementary events corresponding to the event is the outcome.

## Impossible events

The event which never occurs is an impossible event. So the probability of an impossible event is always zero.

## Sure event

The event which certainly occurs is a sure event.

In general, it is true that for an event E,

$$P(\bar{E}) = 1 - P(E)$$

Here the event  $\bar{E}$  is representing "not E". This is called the compound of the event 'E'. So 'E' and  $\bar{E}$  are complementary events.

**Cards:** A pack of cards consists of four suits.

They are

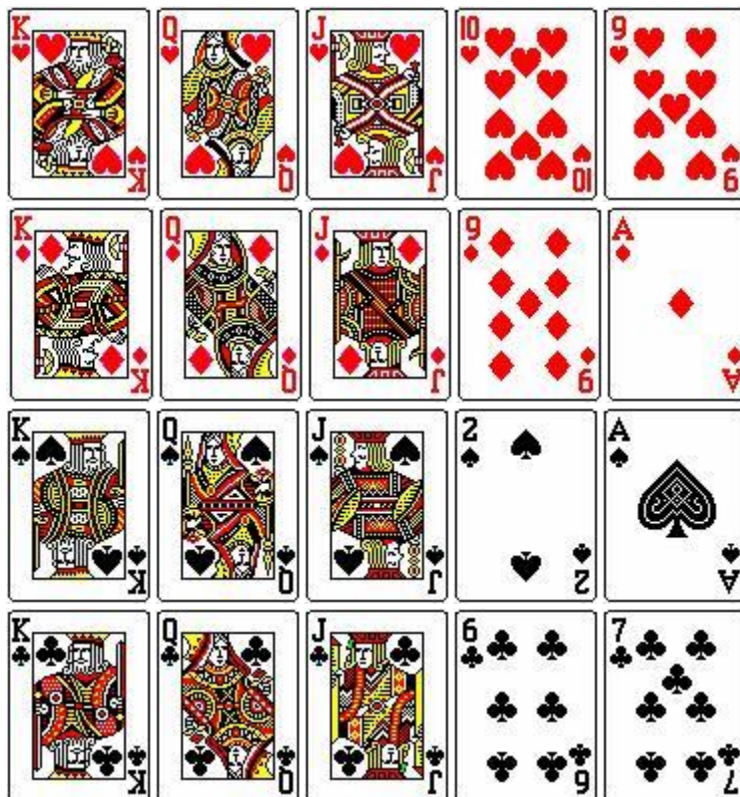
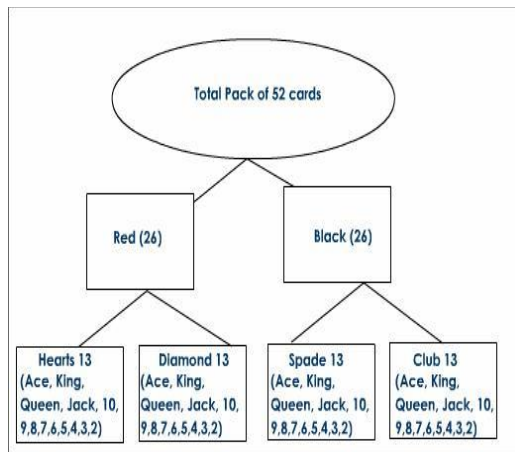
Spades ♠,

Hearts ♥

Diamond ♦ and

Clubs ♣

Each suit consists of 13 cards, nine cards numbered 2, 3, 4 ....10, an ace a jack, a queen, and a king. Spades and Clubs are black in colour. Hearts and Diamonds are red in colour. So there are 26 black cards and 26 red cards. King, queen and jack are called face cards. There are totally 12 (4 x 3) face cards in a pack of 52 cards. I.e. in each suit we have 3 face cards.



**Coins:** A coin has two sides namely head and tail. In the experiment of tossing a coin once, there are 2 possible outcomes - 1 head, 1 tail.

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



**Die:** A die is a well balanced cube with six faces numbered from 1 to 6. Dice is the plural form. There are six equally likely outcomes – 1, 2, 3, 4, 5, 6 in a single throw.

