Concepts and Definations to remember.

— Definations of Probability

* A Random Experiment has N possible outcomes. M of them are favourable, Then Probability of E is

$$P(E) = \frac{M}{N}.$$

* A Random Experiment is conducted large number of times independently under identical condition.

n be the no. of trials of experiment.

Event E occurs a_n times.

Then $\lim_{n\to\infty} \frac{a_n}{n}$ exists, Also, $P(E) = \lim_{n\to\infty} \frac{a_n}{n}$

* S be a Sample space. Consider class sets of subsets of S i.e denoted by $\mathcal{E}$

(i) if $E \in \mathcal{E} \Rightarrow E^c \in \mathcal{E}$

(ii) if $E_1, E_2, E_3 \cdots \in \mathcal{E} \Rightarrow \bigcup_{i=1}^{\infty} E_i \in \mathcal{E}$

Then, Probability is defined as a function

$$P : \mathcal{E} \to [0,1]$$

(1) $P(E) \geq 0 \quad \forall E \in \mathcal{E}$

(2) $P(S) = 1$

(3) $E_1, E_2, E_3 \cdots$ be pairwise disjoint, then $P\left(\bigcup_{i=1}^{\infty} E_i\right) = \sum_{i=1}^{\infty} P(E_i)$

$$\left.\begin{aligned} P(A \cup B) &= P(A) + P(B) \\ P(A \cup B \cup C) &= P(A) + P(B) + P(C) \end{aligned}\right\} \text{Pairwise disjoint.}$$

Also, 1) $P(\phi) = 0$.

2) if $F \subset E$

Then $P(E) \geq P(F)$

3) $P(E^c) = 1 - P(E)$