Basic Probability Concepts

Experiment
Process of Trial & observation

Random Experiment
when outcome is uncertain before experiment is Performed

Sample Space
collection of possible elementary outcomes

Event
Subset of Sample Space

Union (OR)
event that consists of all sample points in either A or B or both.
$A \cup B$ or A or B
meaning A+B.

Intersection (AND)
event that consists of all sample points in both A & B
$A \cap B$ (or) A and B
Just sample points in common.

Mutually Exclusive
When their intersection doesn't contain any sample points (nothing in common)

Difference Of Events
A-B → all sample points in A but not in B
*A-B ≠ B-A

Classical Probability

$P[A] = \frac{\text{no. of favourable outcomes}}{\text{no. of possible outcomes}}$

$P[A] = \frac{N_A}{n}$

Axiomatic Probability

P[A]

1. $0 \leq P[A] \leq 1$ → the probability of A happening is restricted b/w 0 & 1 cannot be more or less.
2. $P[S] = 1$ → Probability of outcome being from sample space is 1 meaning certainly.
3. $P[\emptyset] = 0$ → Probability of outcome coming outside sample space is 0 meaning impossible
4. $P[A_1 \cup A_2 \cup \dots] = P[A_1] + P[A_2] + \dots$

→ mutually exclusive events $A_i \cap A_j = \emptyset$

→ $P[A_1 \cup A_2 \dots] = \sum_{i=1}^{n} P[A_i]$