Variables

X

Type of Variable

- Quantitative
  - Discret Quant variables
  - Continous Quant. variables
- Qualitative
  - Nominal quali. variable
  - ordinal quali. variable

Random variable

Y

Y = Rain[

Y = coin C_7^4

Type of Random Variable

- Discrete Random Variable
  - Eg:- coin, Dice, Result,
- Continous Random Variable
  - Eg:- Rain, height,

Probability

It is the likelihood of the event

Probability alway b/w 0 to 1

$$\text{probability} = \frac{\text{no of ways it can happen}}{\text{Total no. of outcome}}$$

Eg:- Toss a coin

$$P_{coin} = \frac{1}{2}$$

$$P_{Dice} = \frac{1}{6}$$

Type of probability

① mutually Exclusive
② Non-mutually Exclusive

① mutually Exclusive :-

The event where the Probability to come 1 outcome.

Eg:- coin = H/T

Dice = 1/2/3/4/5/6

Result = pass/fail

= T/F

Gender = M/F/T

② non-mutually Exclusive -

The event where probability of outcome will be more than one.

Eg:- Deck of card

P king = $\frac{4}{52}$

king and ♡, ♧, ♢, ♤

Rule of probability

1. Additive rule of prob.
2. multiplicative rule of prob.

1. Additive rule of prob.–

1st-type $P(A \text{ or } B) = P(A) + P(B)$

Eg:- Dice 2 and 5 prob.

$P(2 \text{ or } 5) = P(2) + P(5)$

$= \frac{1}{6} + \frac{1}{6}$

$= \frac{2}{6} = \frac{1}{3} = 33.33\%$

2nd-Type

card king and ♦ prob.

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(K \text{ or club}) = P(K) + P(\clubsuit) - P(K \text{ and club})$$

$$= \frac{4}{52} + \frac{13}{52} - \frac{1}{52}$$

$$= \frac{16}{52}$$

$$P(K \text{ or club}) = \frac{4}{13}$$

② multiplicative rule of prob :-

① Independent event :-

No of outcome will not reduse.

$$P_{com} = P(H) \times P(T) \times P(T)$$

$$= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$$

$$= \frac{1}{6}$$

② Dependent event :- no of outcome will reduce.

Eg:- Prob. 3 king

$$P(K) = P_1(K) \times P_2(K) \times P_2(K)$$

$$= \frac{4}{52} \times \frac{3}{51} \times \frac{2}{50}$$

$$= \frac{24}{132600} \Rightarrow \frac{1}{5525}$$

Permutation

eg:- In a school trip 50 students facing 6 different chocolate.

[Dm, KK, Perk, munch, KJ, 5star]

picking three chocolate.

n = # of object

r = # of object picking

$$nP_r = \frac{n!}{(n-r)!}$$

$$= \frac{6!}{(6-3)!}$$

$$= \frac{6 \times 5 \times 4 \times \cancel{3 \times 2 \times 1}}{\cancel{3 \times 2 \times 1}}$$

$$= 120$$

Combination

$n = 6$

$r = 3$

$$^{n}C_{r} = \frac{n!}{r!(n-r)!}$$

$$= \frac{6!}{3!(6-3)!}$$

$$= \frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{3 \times 2 \times 1 \times 3 \times 2 \times 1}$$

$$= 20$$