



- 1) Mutually exclusive P(AnB) =0
- 2) Independent event P(ANB) = P(A). P(B)
- 3) Addition law-P(AUB) = P(A) + P(B)-P(ADB)

when L ils . mutually exclusive - P(AVB) = P(A) + P(B)

- · independent event P(AUB) = P(A) + P(B) P(A) · P(B)
- 4) Conditional Publishity =

5)Random vaviable

6) Purohability mass function (pmf) - discrete

- i) Pi ≥ 0
- ii) & Pi = 1
- Pushability density function (pdf) continuous

- i) f(x) ≥0



Properties

8) Cumulative distribution function (cdf)

9) Relationship between pdf and cdf

$$f(x) = \frac{d}{dx} F(x)$$

10) Expectation

$$E(x) = \int \{ x p(x) \}$$
 or $\{ x \in X : p(x) \}$ or $\{ x \in X : p(x) \}$

$$E(x^2) = \int (2x^2p^2) \rightarrow x$$
 is discrete $\int x^2 f(x) dx \rightarrow x$ is continuous

11) Variance (x) on Var (x):

.. Var (x) ≥ 0

12) Standard Deviation (SD):

NOTE :-



MOMENTS

1) Alcout origin

$$E(x^{\gamma}) = \int \angle x^{\gamma} Pi$$
, if x is discute
$$\int x^{\gamma} f(x) dx$$
, if x is continuous

7th moment about origin Y=1, first moment is E(x)Y=2, secondmoment is $E(x)^2$

2) Alcout mean:

$$E(x-\overline{x})^{2} = \int \xi(x-\overline{x})^{2} Pi$$

$$\int (x-\overline{x})^{2} f(x) dx$$

7th moment

about mean

3) Alout any point A:

$$E(x-A)^{r} = \int \Sigma(x-A)^{r} P;$$

$$\int (x-A)^{r} f(n) dn$$

MOMENT GENERATING FUNCTION:

$$M_{M}(t) = E\left[e^{tM}\right] = \begin{cases} Ee^{tM}Pi \\ \int e^{tM}f(n)dn \end{cases}$$

$$E(x) = \frac{d}{dt}M_{M}(t) \mid_{t=0}$$

$$E(x^{2}) = \frac{d^{2}}{dt^{2}}M_{M}(t) \mid_{t=0}$$





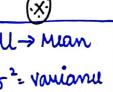
$$e^{x} = 1 + \frac{x^{2}}{1!} + \frac{x^{2}}{2!} + \frac{x^{3}}{3!} + \dots$$

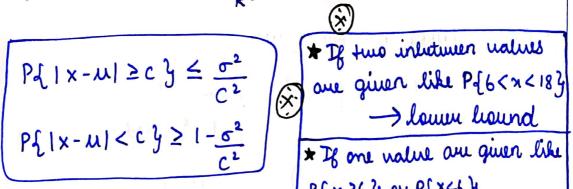
$$=) E \left(1 + \frac{t^{2}}{1!} + \frac{t^{2}n^{2}}{2!} + \frac{t^{3}n^{3}}{3!} + \cdots \right)$$

FUNCTIONS OF RANDOM VARIABLE:-

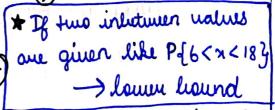
CHEBYCHEV'S INEQUALITY:-

Pf $|x-u| \ge k\sigma y \le \frac{1}{k^2}$ (upper liourd) $U \to Muan$ Pf $|x-u| < k\sigma y \ge 1 - \frac{1}{k^2}$ (lower bound)





for (>0



P{x263 on P{xc6} -> uppur hourd

