✱ Probability Distribution

Type of Pro. Dist.

① Diseret probability Dist.

② Continous probability Dist.

① Discrete probability Distribution

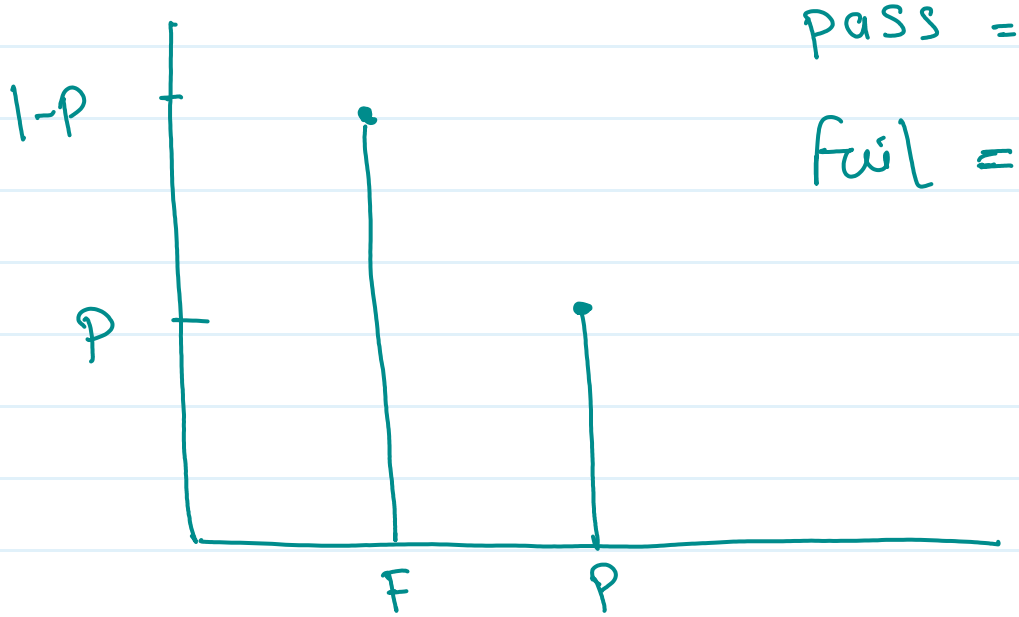
① Bernoulli Dist. –

experiment – single time

Result – fix

pass = P

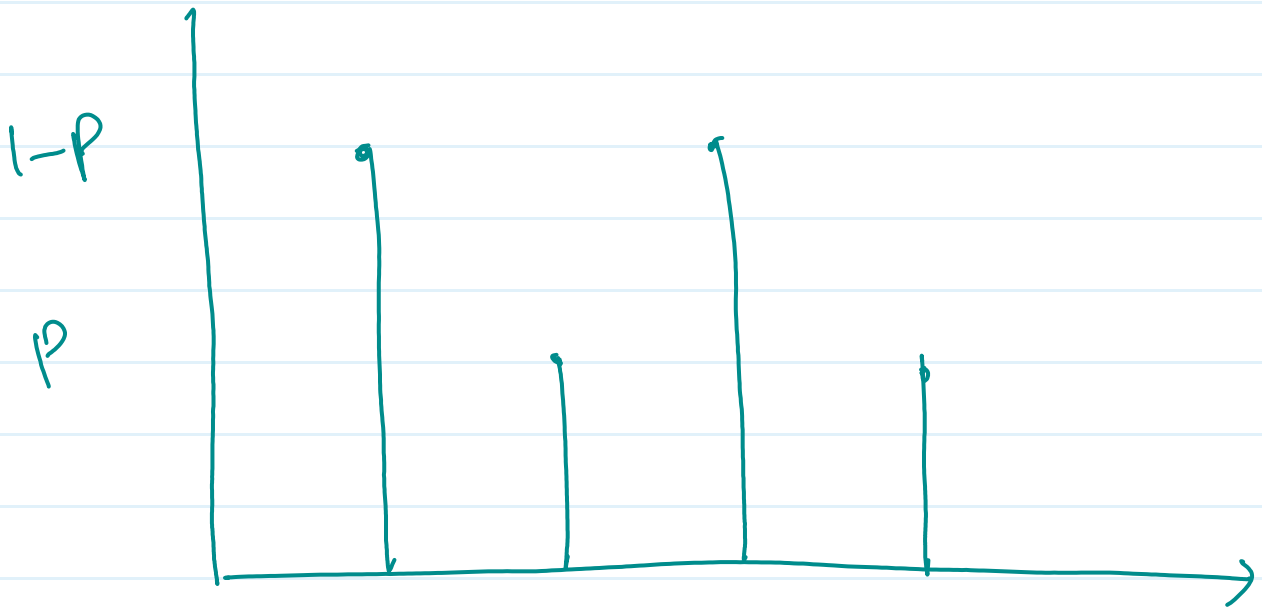
fail = 1-P



(b) Binomial Distribution :-

experiment = fix no. of times

Result = fix



$$P(X = r) = {}^{n}C_{r} (p)^{r} (1-p)^{n-r}$$

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

n = no. of trials

p = prob succes in 1 trial

r = no. of succes in n trial.

eg:- total no of trials $n=4$ prob. getting a redball 1 trials $p=0.6$.

Sol^n

$$P(X=r) = {}^4C_r (0.6)^r (0.4)^{4-r}$$

$$P(X=0) = {}^4C_0 (0.6)^0 (0.4)^{4-0} = 0.0256$$

$$P(X=1) = {}^4C_1 (0.6)^1 (0.4)^3 = \underline{0.1536}$$

(c) Poisson Distribution:-

Poisson distribution is used to model the number of events that occur in a fixed interval of time or space, given the average rate of occurrence, assuming that the events happen independently and at a constant rate.

It deals with **discrete random variables**, meaning the number of events can only take on non-negative integer values (0, 1, 2, 3,...). Each event is considered to be independent of others and they are assumed to occur at a constant average rate (λ) over the given interval

$$P(X=k) = \frac{e^{-\lambda} \lambda^{k}}{k!}$$

λ = Average. $e = 2.718$

Eg: In a hospital Avg 14 call received in a single day. What is the probability to recieve 7 calls in a day.

Soln :) $k = 7$

$\lambda = 14$

$$= \frac{e^{-14}\ 14^{7}}{7!}$$

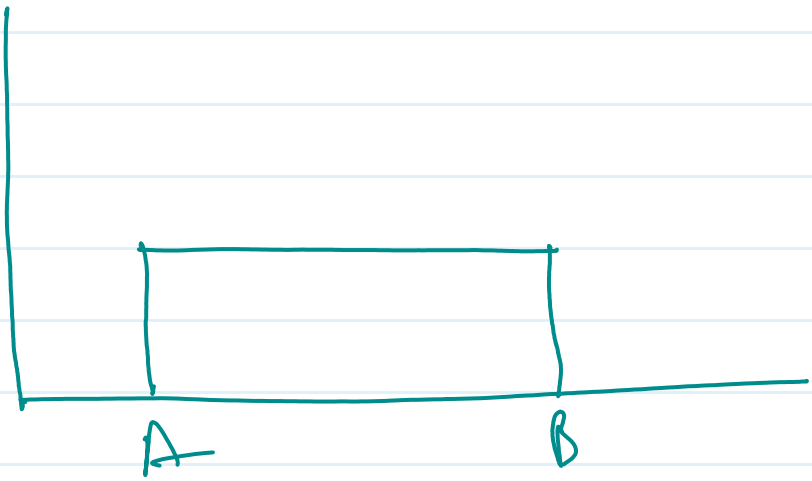
$$P(X=7) = \frac{(8.31 \times 10^{-7}) \times 105413504}{5040}$$

$$= 0.017/100$$

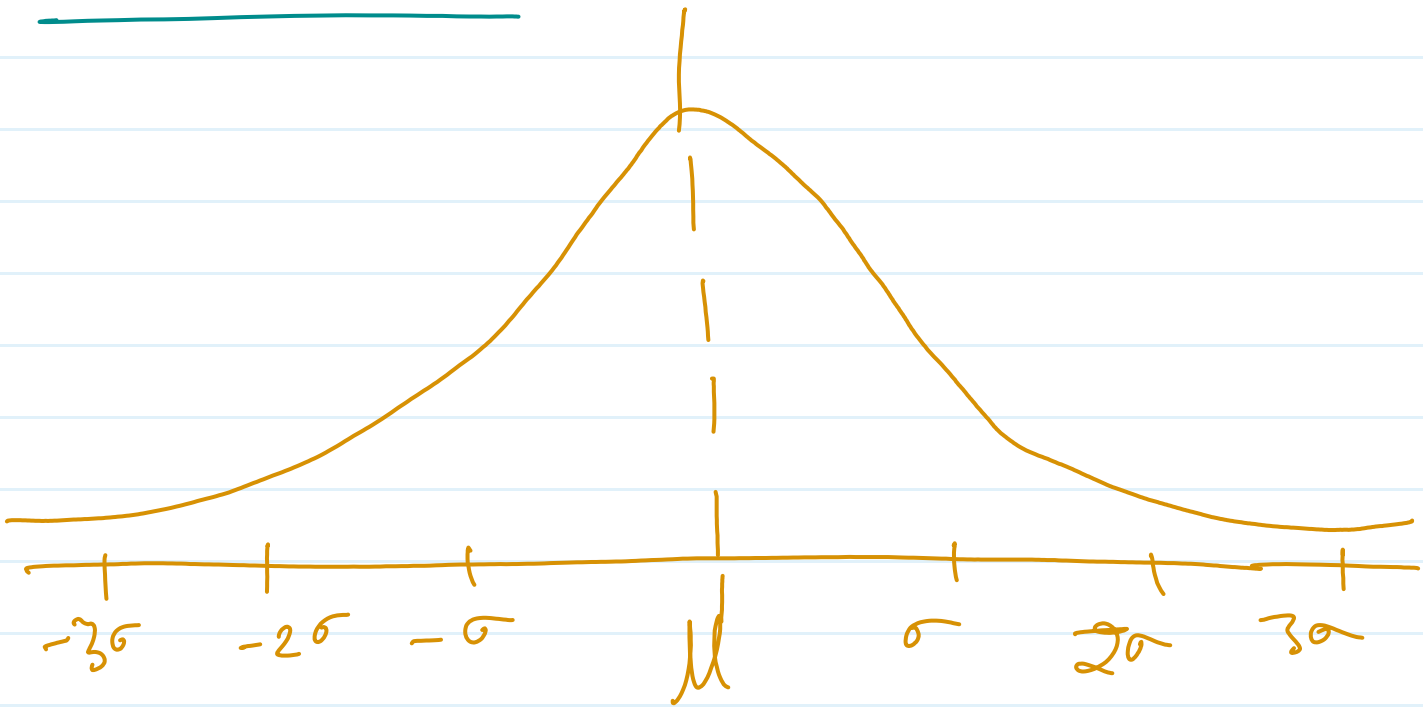
$\Rightarrow$ 1.7 %

② Continous probability Dist.

ⓐ Uniform Dist. :-



ⓑ Normal Dist. -



(c) standard normal dist. –

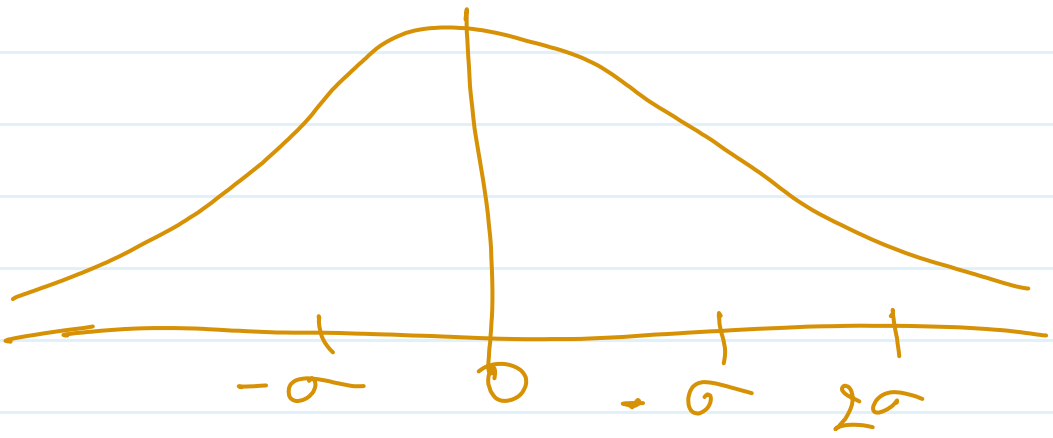
$\mu = 0$

$SD = 1$

Nor. to SD. Nor

Z-score formula.

$$Z = \frac{x_i - \mu}{\sigma}$$



Eg: [1, 2, 3, 4, 5, 6, 7]

$\mu = 4$

$\sigma = 1$

$x_i - \mu$

$1 - 4 = -3$

$2 - 4 = -2$

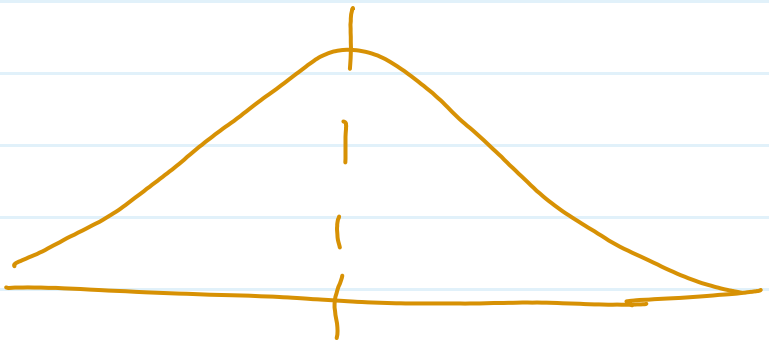
$3 - 4 = -1$

$4 - 4 = 0$

$5 - 4 = 1$

$6 - 4 = 2$

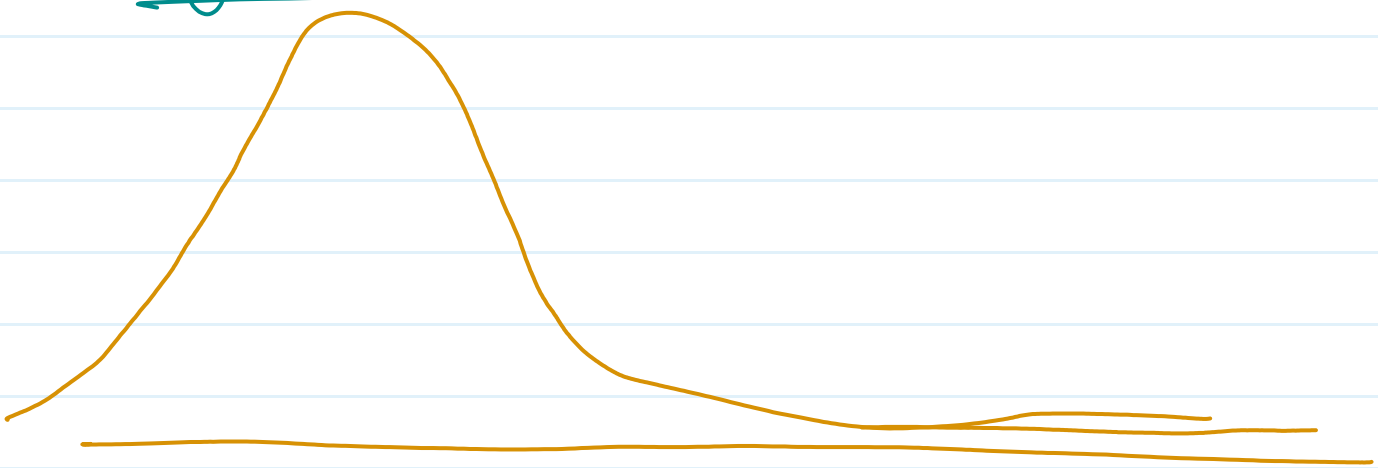
$7 - 4 = 3$



$\mu = 0$

$SD = 1$

② log Normal Dist



(e) exponential Dist.

$$f(x) = \lambda e^{-\lambda x}$$