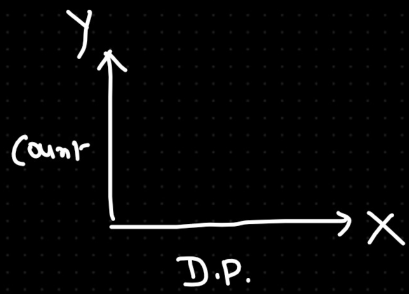
1. Data distribution.



2. Probability.
3. Random variable
4. Probility distribution function
   - PMS (Probability mass fln)
   - PDF (Probability density fln)
   - CDF

PMS (discreate)

1. Uniform dist-
2. bernoulli dist
3. binomial | multinomial
4. Poisson dist-

PDF (continues)

1. Normal dist-
2. SND
3. Power law
4. Pareto dist-
5. log normal dist-
6. $\boxed{\text{T, F, Chi-squre dist..}}$

Probability.

Navies bayes algo

text classification.

$\Leftarrow$ ML

1. $\boxed{\text{Basic Prob. theroy.}}$
2. Indenpent events
3. Dependent event / conditional Prob.
4. Naive bayes theoram
5. types of event in Prob. like mutually enclusive events

coin $\Rightarrow P(H) \Rightarrow \frac{1}{2} = 50\%$

toss a coin. $\Rightarrow \dfrac{\text{fav. outcomes.}}{\text{total no. of outcome}}$

Dice. $\Rightarrow P(S) = \frac{1}{6}$

$P(\text{not } S) = \frac{5}{6}$

$= 1 - \frac{1}{6} = \frac{6-1}{6} = 5/6$

$P(\text{happening}) + P(\text{not happening}) = 1$

$P(A) + P'(A) = 1.$

Ques. bag $\Rightarrow$ 5 marble balls

[4 balls is blue
1 is red]

Prob to get a blue marble?

$$= \frac{4}{4+1} = \frac{4}{5}$$

Cards = 52.

What will be the Prob to get a king?

$$\frac{\cancel{4}^{1}}{\cancel{52}_{13}} = \frac{1}{13}$$

Ques. two dice. $\Rightarrow$ Sum = 6

$\square + \square \Rightarrow 6$

$6 \times 6 = 36$

$$\frac{5}{36}$$

$\square$	+	$\square$	
3		3	= 6
1		5	= 6
5		1	= 6
4		2	= 6
2		4	= 6
~~6~~		~~0~~	

Que. 52 ⇒ King of heart ⇒ $\frac{1}{52}$

Random variable

$$X + 5 = 6$$

$$X = 6 - 5$$

traditional variable ⇒ $\boxed{X = 1}$

Random variable ⇒ Random experiment

(H, T) — (tossing a coin)

(1, 2, 3, 4, 5, 6) — (Dice Rolling)

(Pass or Fail) — (Exam Result)

Random variable ⇒ (1) Discreate
(2) Continuy.

Coin, Dice, cards. (whole no.)

H, T
{1, 2, 3, 4, 5, 6}
{C, S, D, H}

Probility mass function.

Continuy

Height

$\boxed{a \leq \text{Height} \leq b}$

Height ⇒ 5.6, 5.65, 5.655, 6.2,
6.21

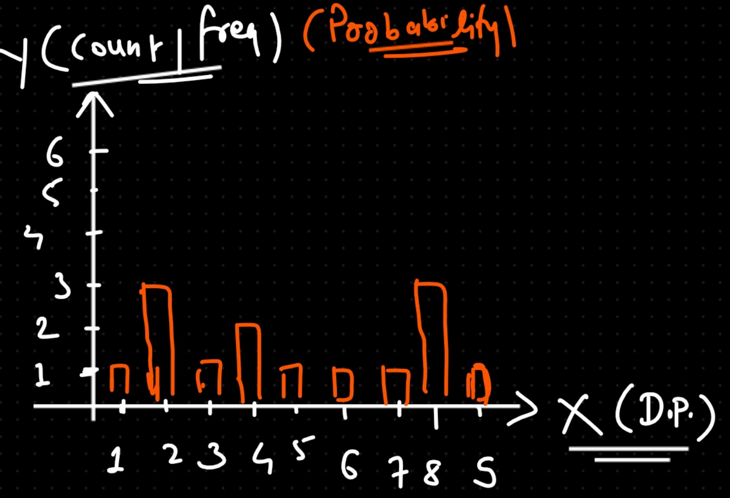
Weight

$X \leq \text{weight} \leq Y$

Probability density function

Data distribution. [2,3,4,4,2,2,1,5,6,7,8,8,8,9]

[1,2,2,2,3,4,4,5,6,7,8,8,8,9]



Data distribution.

Probability dist-

1. Probability mass function (PMF) (Discreate variable)
2. Probability density function (PDF) (continous variable)

Probability mass function.

(Discreate var)

(coin, Dice, marble, card)

$$P(X=x) = P_i$$

$\boxed{\text{Coin}}$

$$P(X=H) = \frac{1}{2} = 0.5$$

$$1 \leq P_i \geq 0$$

$$\boxed{\sum P_i = 1}$$

$$\Rightarrow 1 - 0.5 = 0.5$$

$$\boxed{0.5 + 0.5 = 1}$$

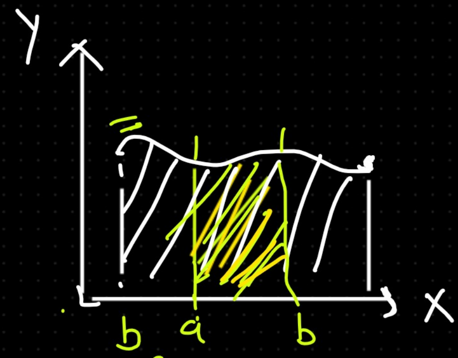
$$\boxed{0 \leq P_i \leq 1}$$

Probability density. function

(continues var)

(Height, weight, IQ)

$$\boxed{\int_{-\infty}^{+\infty} f(x)\,dx = 1}$$



$$\int_a^b f(x)\,dx = P_i$$

$$P(X=x) = \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

$$\boxed{a \leq x \leq b}$$

$-\infty$ $+\infty$

Probability Mass function.

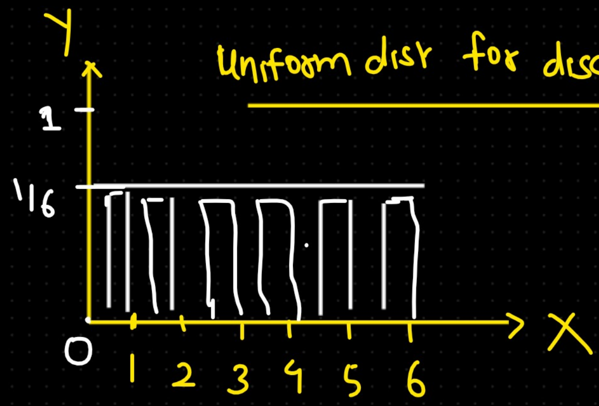
Probability Disr wrt. Discreate var

1. Uniform distribution.

Random variable in dice.

Dice. $\Rightarrow$ $X=1$ $\quad X=2 \quad X=3 \quad X=4 \quad X=5 \quad X=6$

Prob for $(1,2,3,4,5,6) \Rightarrow P(X=1)=\frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} = 1$



Uniform disr for discreate Random var

Bernoli dist (Binary outcome)

- Y/N
- 0/1
- P/F
- H/T

Bernouli dist → (binary outcome)

wrt only single try

toss → coin → only one time ⇒ H, T

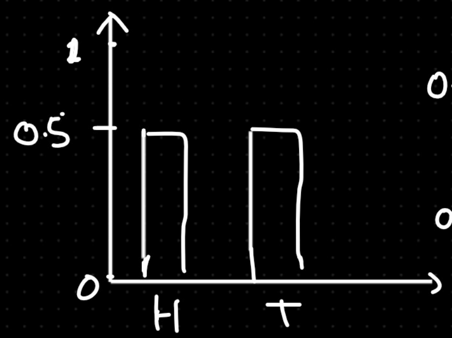
Exam → one time → Pass | fail

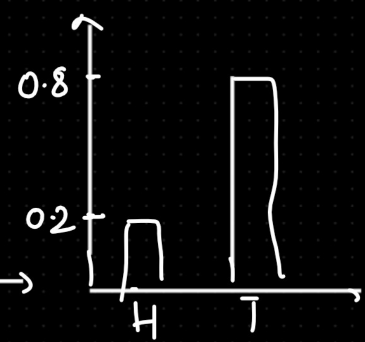
Coin.

(H, T)

Random variable

Coin.	$X = H$	$X = T$
$P(X=\{H,T\})$	$\frac{1}{2}$	$\frac{1}{2}$
=	0.3	0.7
	0.4	0.6
	0.2	0.8





H|T

P|F

R|L

$$\boxed{P(X=x) = p^{x} \cdot (1-p)^{1-x}}$$

$5^0 = 1$

$$P(X=0) = p^0 \times (1-p)^{1-0}$$

Int

$$= 1 \times (1-p)^{1}$$

$$\boxed{P(X=0) = (1-p)} \qquad \boxed{P(X=1) = p}$$

Binomial distr $\Rightarrow$ $= \boxed{{}^{n}C_{r}\, p^{r} \cdot (1-p)^{n-r}} \Rightarrow$

Bernouli distr $\rightarrow$ one try (binary outcome)

Binomial distr $\Rightarrow$ n try (binary outcome)

multinomial distr $\rightarrow$ n try (multiple outcome)

Coin $\Rightarrow \{H, T\} \Rightarrow$ toss only one time

Coin $= \{H, T\} \Rightarrow$ toss two times i want atleast one head.

$\downarrow$

(Concecuative)

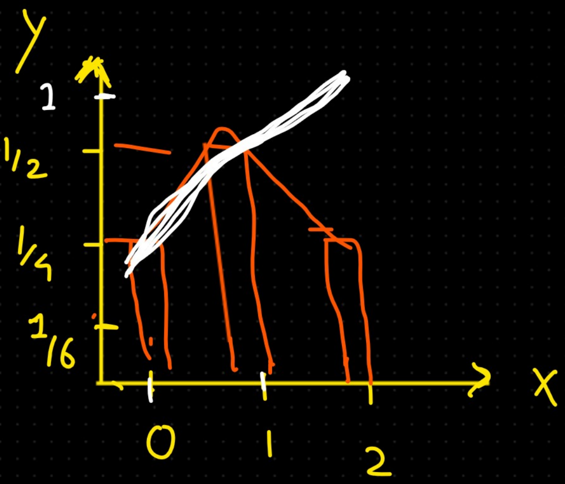
1 2 ⇒ Head.

1	2
H	H
H	T
T	H
T	T

$P(X=0) = 1/4$

$P(X=1) = \frac{2}{4} = \frac{1}{2}$

$P(X=2) = \frac{1}{4}$



Commulative.

$\underbrace{\underbrace{1+2}_{3}+3}_{6}+4+5$

6 + 4

$\underbrace{10 + 5}_{15}$

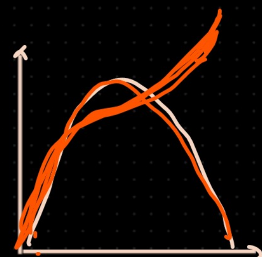
15

$P(X \leq 1)$

⇓

$P(X=0) + P(X=1)$

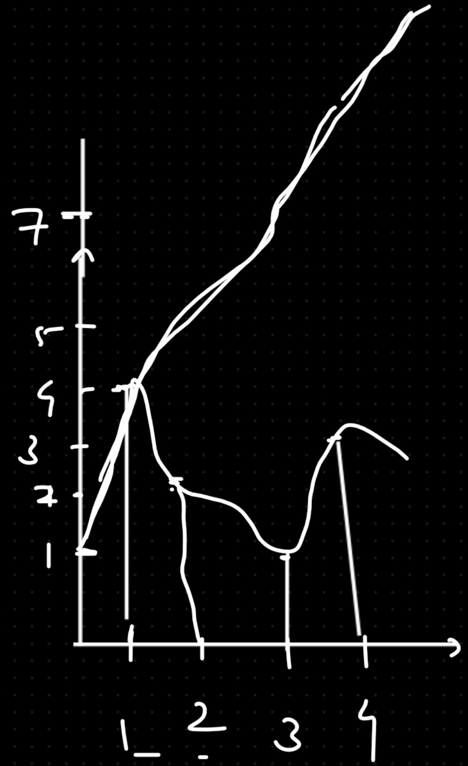
$1/4 + \frac{1}{2} = \frac{1+2}{4} = \frac{3}{4}$



$P(X \leq 2)$

$P(X=0) + P(X=1) + P(X=2)$

$\frac{1}{4} + \frac{1}{2} + \frac{1}{4} = \frac{1+2+1}{4} = 1$



$(\text{1 and 2}) = 4+3 = 7+2 = 9$

6 People

Blood group category

O+ B+ A+ AB+

3 1 1 1

$$^5C_2\left(\tfrac{1}{2}\right)^2\left(\tfrac{1}{2}\right)^3 \text{ Binary}$$

$$\boxed{^nC_r\, P^r (1-P)^{(n-r)}}$$

Combination

$$^7C_3 = ?$$

$$\frac{6!}{3!\,1!\,1!\,1!} \times \left(\tfrac{3}{6}\right)^3 \times \left(\tfrac{1}{6}\right)^1 \times \left(\tfrac{1}{6}\right)^1 \times \left(\tfrac{1}{6}\right)^1$$

$$\frac{7\times6\times5}{3\times2\times1} =$$

$$\frac{7!}{3!\times(7-3)!} = \frac{7!}{3!\times4!}$$

$$= \frac{7\times6\times5\times\cancel{4!}}{3!\times\cancel{4!}}$$

$$= \frac{7\times6\times5}{3\times2\times1}$$

$$P(X=O^+) = 3/6$$

$$P(X=A^+) = 1/6$$

$$P(X=B^+) = 1/6$$

$$P(X=AB^+) = 1/6$$