Probability

:→ Chances of event occuring.

$$\text{Probability } (P) = \frac{\text{no. of favorable outcome}}{\text{Total outcome.}}$$

one

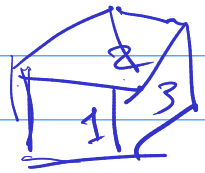
① Tossing a coin = {H, T} = 2 Total

$P(H) = 1/2 \qquad P(T) = 1/2$

one

② Throwing a Dice = {1, 2, 3, 4, 5, 6}

= 6



$P(1) = 1/6 \quad P(2) = 1/6 \quad P(3) = 1/6 \quad P(4) = 1/6$

$P(5) = 1/6 \quad P(6) = 1/6.$

no. of events occuring

two dice

Total outcome = {36} = outcome

= {1,1} {1,2} {1,3} (1,4) (1,5) (1,6)

(2,1) (2,2) (2,3) - - - - .

- - - - - - - - - - - -

(6,1) (6,2) (6,3) (6,4) (6,5) (6,6)

$P(2) = (1,1) = 1/36$ → chance → Total chance.

$P(3) = (1,2)(2,1) = 2/36$

$P(4) = (1,3)(3,1)(2,2) = 3/36$

$P(11) = (6,5)(5,6) = 2/36$

$P(12) = (6,6) = 1/36$

Probability Distribution

It is a list of all possible outcome of Random Variable along with their Corresponding probability.

Throwing a dice.

S →	1	2	3	4	5	6
Probability	1/6	1/6	1/6	1/6	1/6	1/6

← one event

Two dice

3 dice?

Probability Distribution function:-

It is a mathematical expression that describe the probability of different possible outcome for an experiment.

$$y = f(x) = y = \begin{cases} 1/6, & \text{if } x \in (1,2,3,4,5,6) \\ 0, & \text{otherwise.} \end{cases}$$

Two Type of Probability Distribution.

1. Discrete Distribution
   ex = no. of student in class.
2. Continuous Distribution.
   ex: height, Distance, Weight, BP, Time.

Discrete Distribution

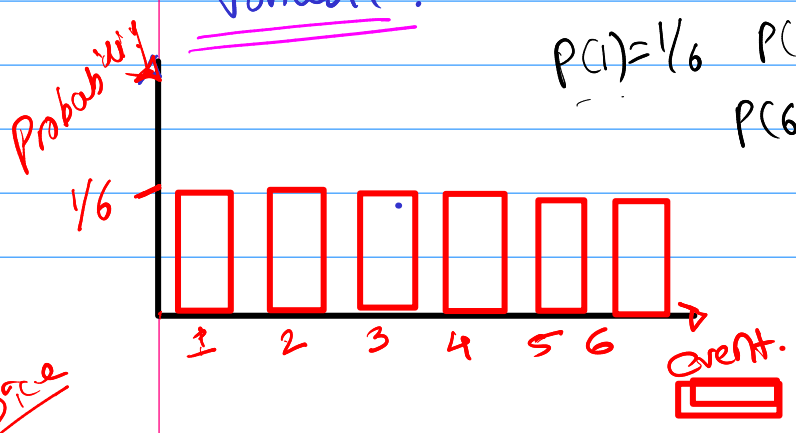
1. Probability Mass function. (PMF)
2. Cummulative Mass function. (CMF)

Continuous Distribution.

1. probability Density function. (PDF)
2. Cummulative Distribution function. (CDF)

A- Probability Mass function. (PMF).

⇒ It is a statistical term that describes the probability Distribution of a discrete random variable.



$P(1)=1/6$ $P(2)=1/6$ $P(3)=1/6$ $P(4)=1/6$ $P(5)=1/6$

$P(6)=1/6$.

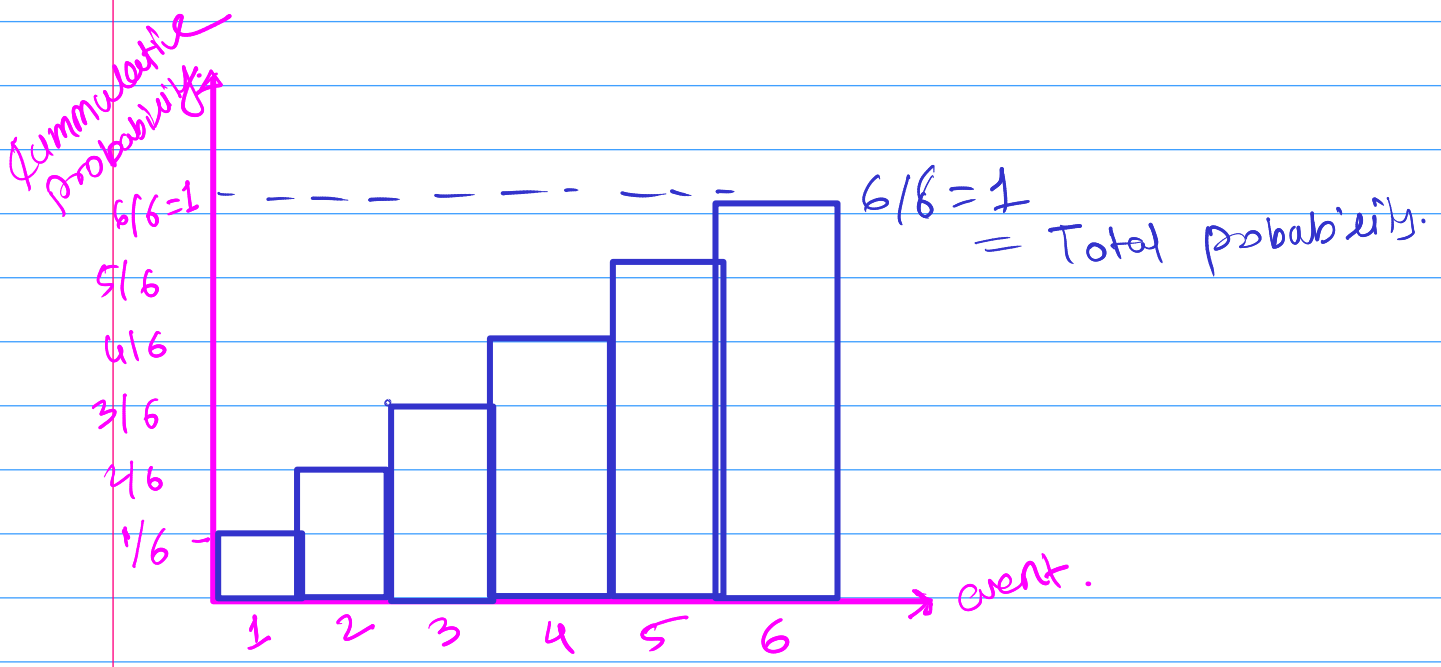
$P(x \leq 4) = P(1)+P(2)+P(3)+P(4)$

$= 1/6+1/6+1/6+1/6 = \frac{4}{6} = 2/3$

B. Cummulative Mass Function (CMF)

: It is another method to describe Cummulative probability of Discrete random Variable.

ex 1, 1, 2, 3, 5, 8, 13,



C. Probability Density Function (PDF)

It is a statistical term that describe the probability Distribution of continuous Random Variable.

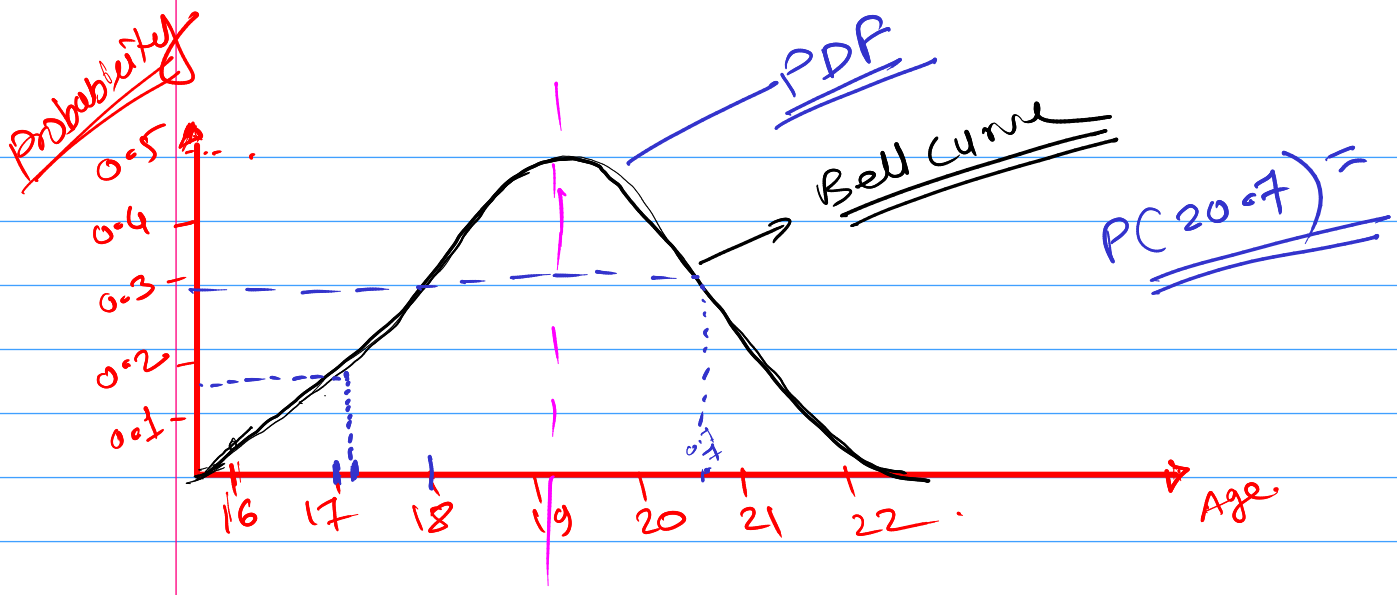
ex = Age. in 10th class.

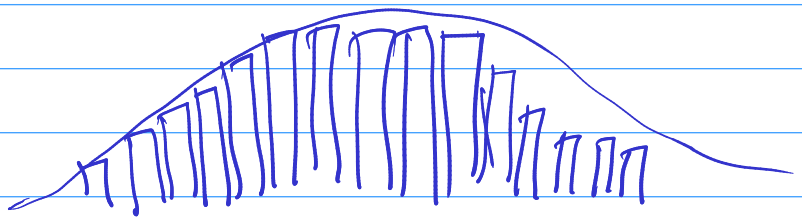
100 student

data = [16, 17, 18, 19, 20, 21 - - - - - - - - - - - - - -]

16 = 1
17 = 2
18 = 20
19 = 40
20 = 16
21 = 1

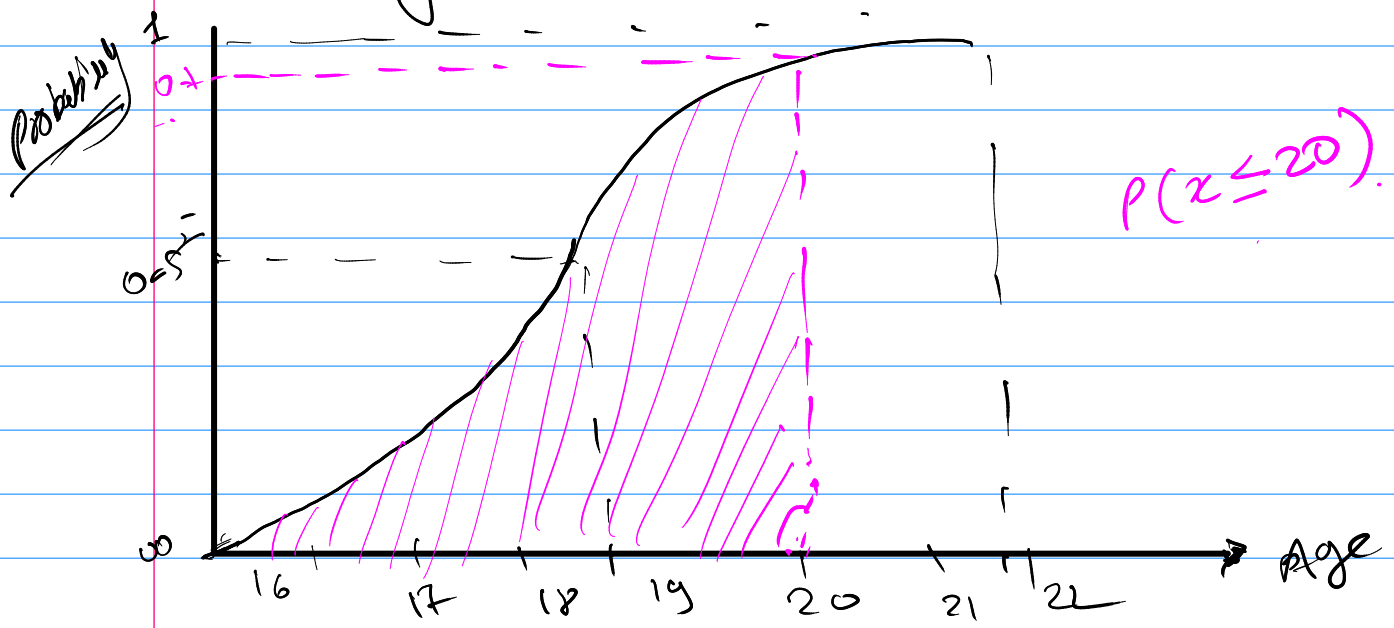
→ Normal distribution.





D. Cummulative Distribution function (CDF)

It is another method to describe the total distribution of Continuous Random Variable.



Standard distribution

1. Normal.
2. Bernoulli
3. Binomial.
4. Uniform.
5. poisson.
6. Log normal.
7. Standard normal.