Probability distribution

Random variable → A set of possible values from a random experiment.

→ A random variable value is unknown.

→ A function that assign values to each of experiment outcomes.

$X = \{1, 0\}$ Tossing a coin - H, T

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

$$P(T) = \frac{1}{2}$$

$\Rightarrow \frac{1}{n}$ where n is Total no of outcome.

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

* dice - 1, 2, 3, 4, 5, 6

$\Rightarrow \frac{1}{6}, \frac{1}{6} \ldots \frac{1}{6}$

$\Rightarrow \frac{1}{n}$ where $n = 6$

↓

function that can be used to get Probability.

Outcomes of an experiment

→ tossing a coin

→ throwing a dice

↓

discrete outcomes

(pmf)

Calculate the height of students in the class.

↓

160 cm, 160.1 cm

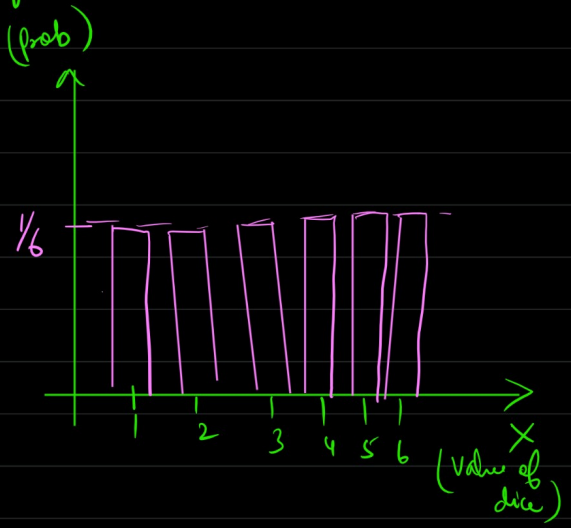
↓

Continuous outcomes.

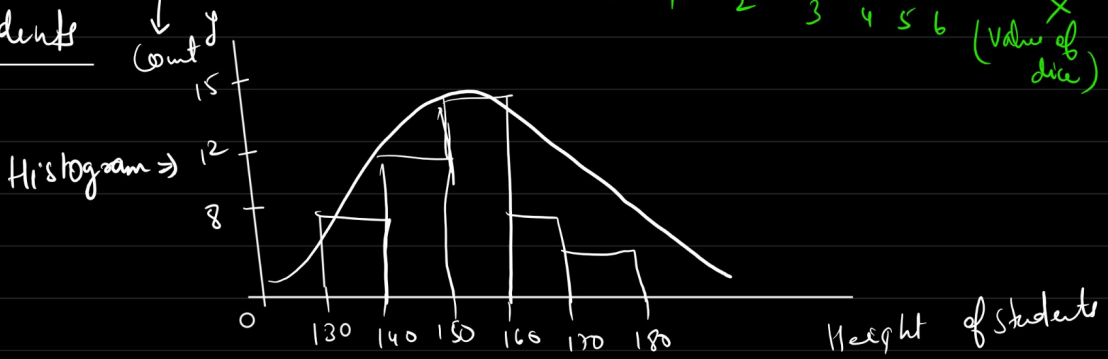
(pdf)

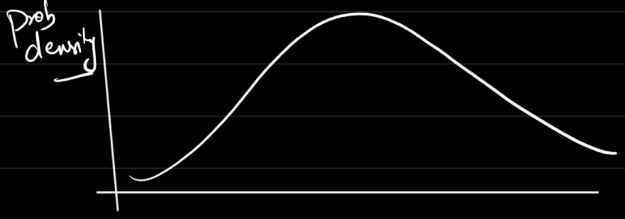
* irrespective of outcomes nature, draw outcomes in a form of distribution, probability distribution function.

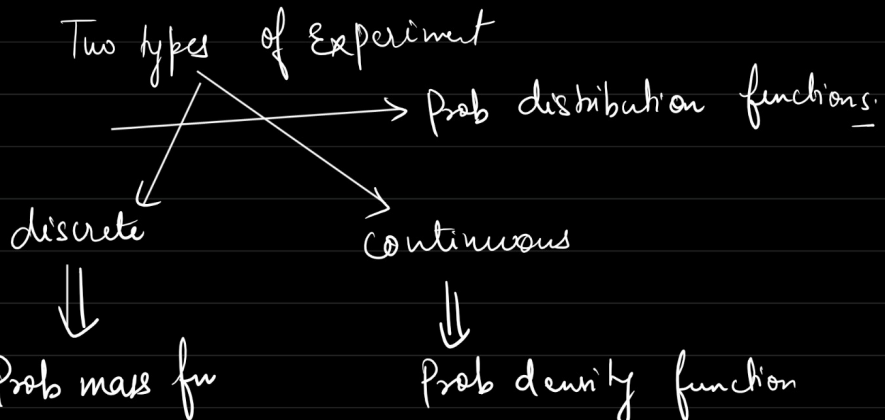
throwing a dice ⇒ $P(1) = 1/6$, $P(2) = 1/6$, $P(3) = 1/6$, $P(4) = 1/6$, $P(5) = 1/6$, $P(6) = 1/6$



Height of students

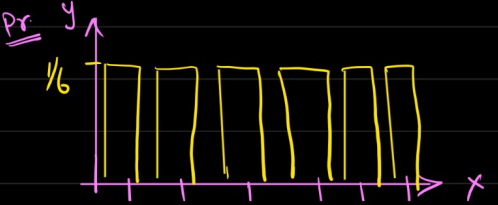






① Probability mass function ⟹ Distribution of Discrete random variable

Eg Rolling of a dice {1, 2, 3, 4, 5, 6}



$Pr(X \leq 3) = Pr(X=1) + Pr(X=2) + Pr(X=3)$

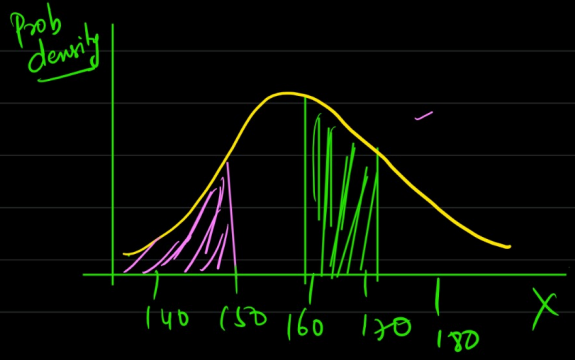
$= 1/6 + 1/6 + 1/6 \Rightarrow 3/6 = 1/2$

1 2 3 4 5 6

$Pr(X \leq 6) = 1/6 + 1/6 + 1/6 + 1/6 + 1/6 + 1/6$

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

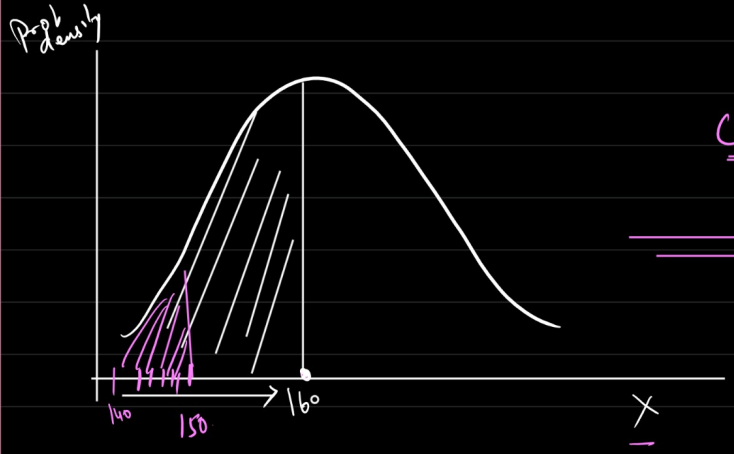
② Probability density fn (pdf) → Distribution of continuous data.



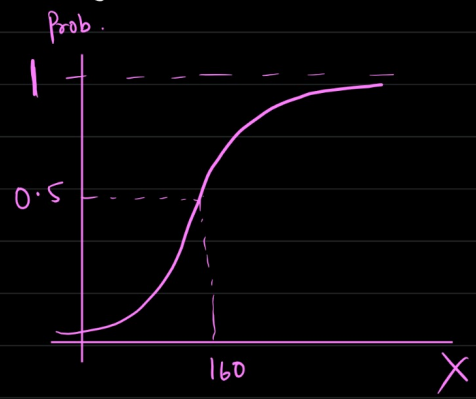
$Pr(X \leq 150)$ = Area under curve

[0 to 1]

③ Cumulative Distribution fn (cdf) → CDF is summation of all probabilities possible upto a given point



Cumulative



X	P(X)	Cdf
1	1/6	1/6
2	1/6	2/6
3	1/6	3/6
4	1/6	4/6
5	1/6	5/6
6	1/6	6/6