Unit III

μ_r' for continuous random variable is

$$\int_a^b x^r f(x)\,dx \quad \text{put } r = 1, 2, 3, 4 \ldots$$

Def: Let x be a c.r.v with const fn $f(x) = k$ which is defined in the interval $a \le x \le b$ then its p.d.f is defined as

$$f(x) = \begin{cases} k \to \frac{1}{b-a} & \forall x \in [a,b] \\ 0, & \text{otherwise} \end{cases}$$

where $f(x)$ is const fn

Note:- Since $f(x)$ is const function and continuous in $a \le x \le b$, we have prop of prob density fn

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

$$= \int_{-\infty}^{\infty} k\,dx = 1$$

$$\Rightarrow \underbrace{\int_{-\infty}^{0} k\,dx}_{0} + \underbrace{\int_{0}^{a} k\,dx}_{0} + \int_a^b k\,dx + \underbrace{\int_b^{\infty} k\,dx}_{0} = 1$$

$$\int_a^b k\,dx = 1 \qquad \Rightarrow k[x]_a^b = 1$$

$\Rightarrow k = \frac{1}{b-a}$

$$f(x) = \begin{cases} \frac{1}{(b-a)} & a \le x \le b \\ 0 & \text{otherwise.} \end{cases}$$

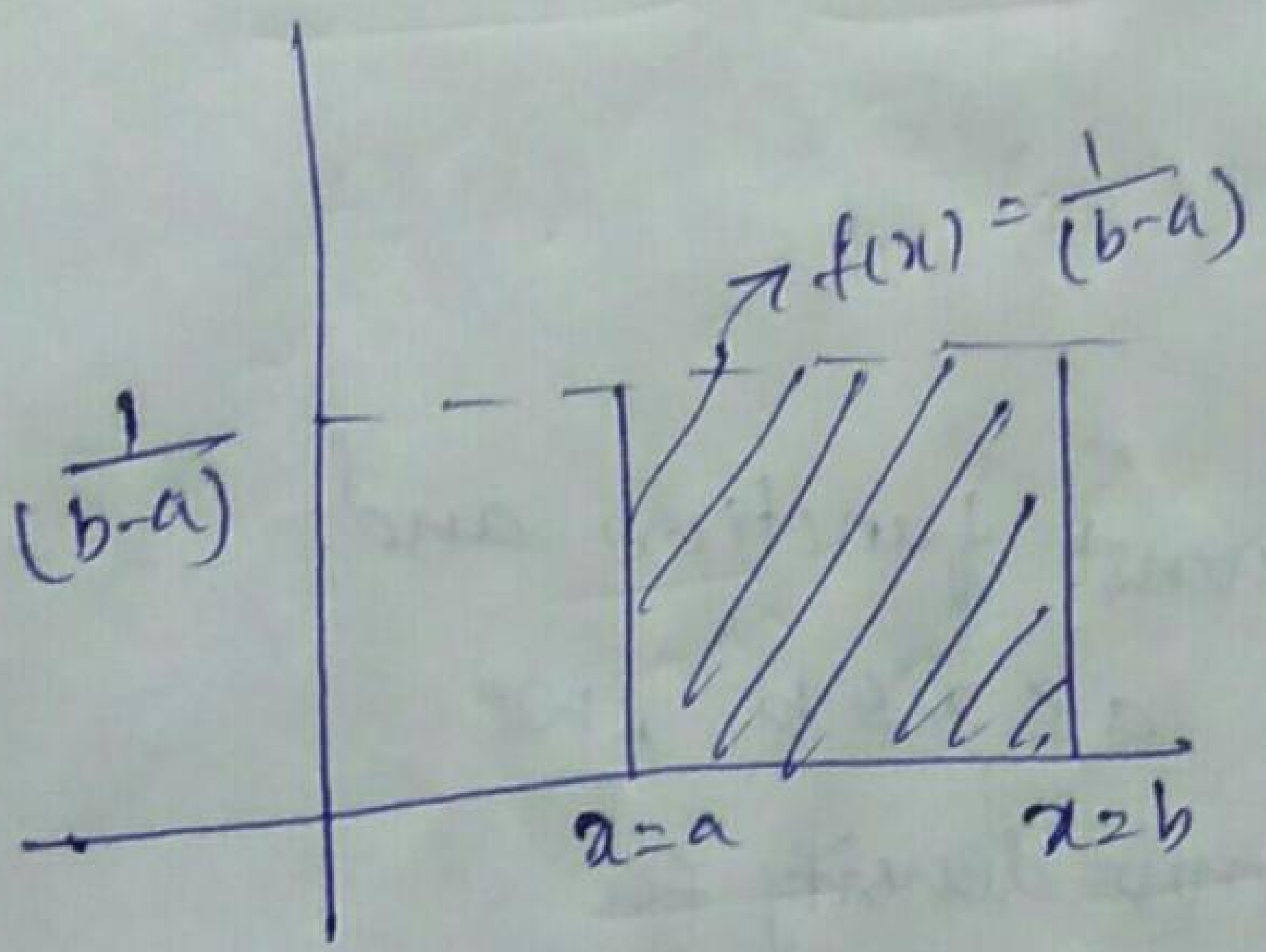
$\downarrow$

p.d.f

for uniform or Rectangular distribution.

=x=

Uniform or Rectangular distribution



Let x be a c.r.v with prob density defined in the fn $f(x) = \frac{1}{(b-a)}$ interval $a \le x \le b$ then

$$f(x) = \begin{cases} \frac{1}{(b-a)} & , a \le x \le b \\ 0 & , \text{otherwise} \end{cases}$$

$\downarrow$

p.d.f for Retangular or uniform distribution.