

CDF (cumulative distributed function)

— $\boxed{F_X(x)} = P(X \leq x)$

— if we have a dice

$$P_{1,2,3,4,5,6} = \frac{1}{6}$$

$$F_X(0) = 0$$

$$F_X(1) = P(1)$$

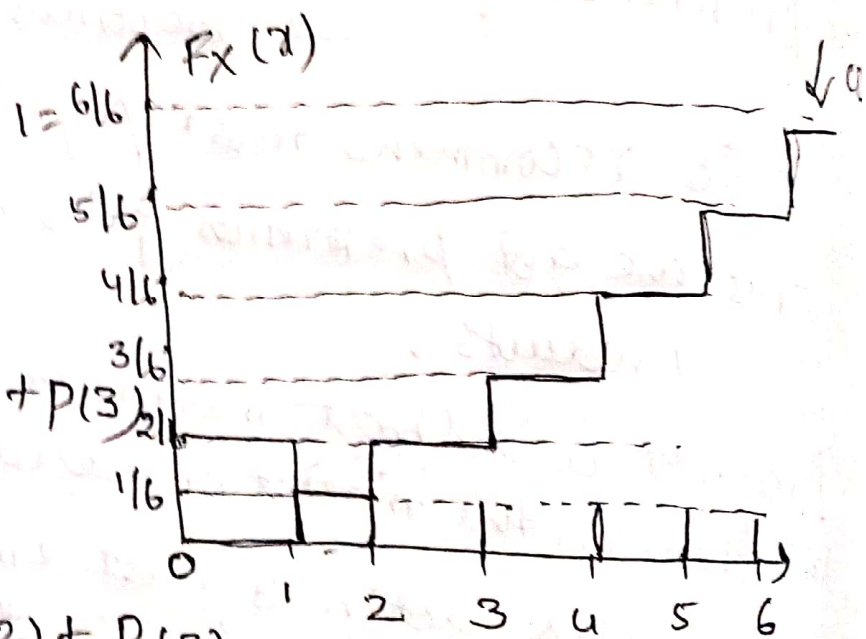
$$F_X(2) = P(1) + P(2)$$

$$F_X(3) = P(1) + P(2) + P(3)$$

$$\vdots$$

$$F_X(6) =$$

$$P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$



properties of CDF

① $F_X(x) \geq 0$ (min val)

② $0 \leq F_X(x) \leq 1$ (range)

③ it is always increasing function upto

PDF (probability density function)

— $f_X(x) = P(X \leq x)$

magnitude of

$$f_X(x) = \frac{dF_X(x)}{dx} \quad \text{--- (1)}$$

$$F_X(x) = \int_{-\infty}^x f_X(x) dx \quad \text{--- (2)}$$

Properties of PDF

① $0 \leq f_X(x) \leq 1$

② total area of PDF = 1 = $\int_{-\infty}^{\infty} f_X(x) dx$

Example

In an experiment, a ball consists of three successive tasks of coin. If we define random variable X as the number of heads appearing on a ball. Determine $P_X(x)$ and $F_X(x)$.

Random Var X	$P(X)$	
0	$1/8$	TTT
1	$3/8$	TTH THT THT
2	$3/8$	HTT HTH HTH
3	$1/8$	HHH

000 - No head - 0
 001 - one head - 1
 011 - two head - 2
 111 - three head - 3

