# * Probability distribution functions and Cumulative distribution function

## ① Pmf

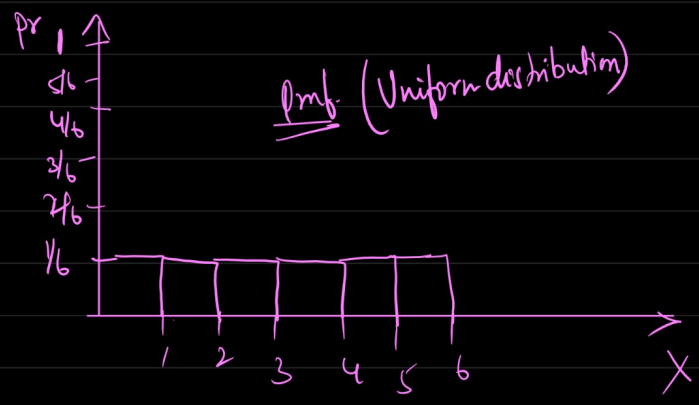
→ Discrete random variable

**Eg:** Rolling a dice

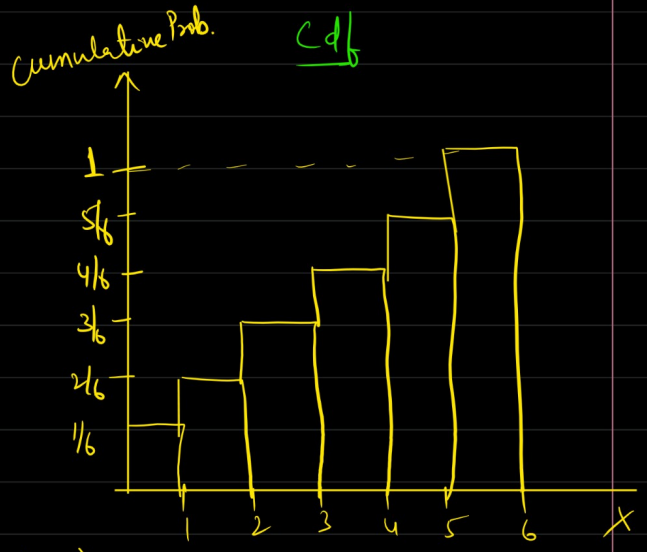
$\{1, 2, 3, 4, 5, 6\}$

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

→ Uniform distribution




Pmf (Uniform distribution)




$P(X \leq 1) = 1/6$

$P(X \leq 2) = P(X=1) + P(X=2)$
$= 1/6 + 1/6 \Rightarrow 2/6$

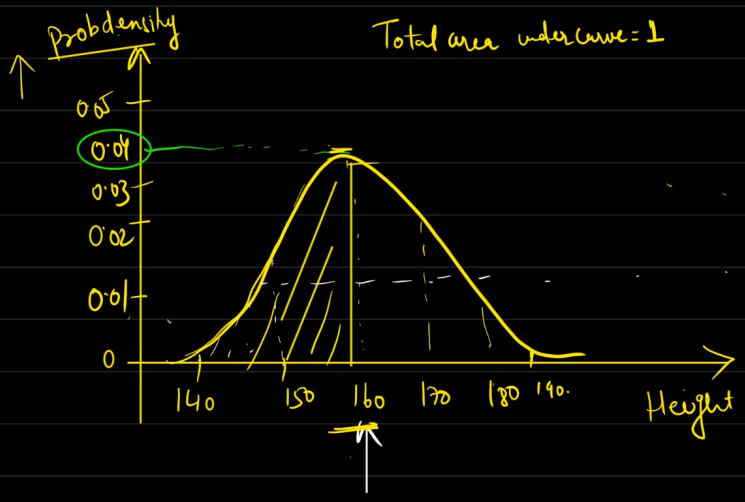
$P(X \leq 6) = Pr(X=1) + P(X=2) + Pr(X=3) + Pr(X=4) + Pr(X=5) + P(X=6)$

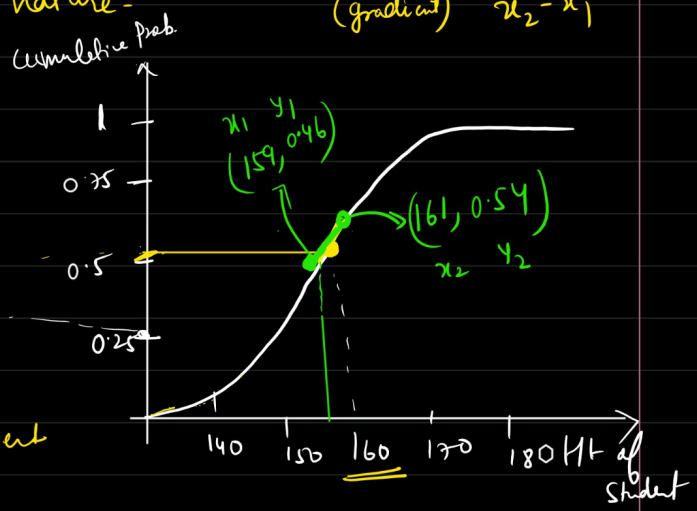
$= 1$

## ② Prob density fn (Pdf)

→ Random Variable is continuous in nature.

Slope (gradient) $= \frac{y_2 - y_1}{x_2 - x_1}$




Prob density of a pdf = slope of cdf.
gradient of cdf.

Gradient (slope) $= \frac{0.54 - 0.46}{161 - 159}$

$\Rightarrow \frac{0.08}{2} \Rightarrow 0.04$