

## Uniform Distribution

Eg: Rolling a dice  $\{1, 2, 3, 4, 5, 6\}$

$$Pr(1) = \frac{1}{6} \quad Pr(2) = \frac{1}{6} \quad Pr(3) = \frac{1}{6}$$

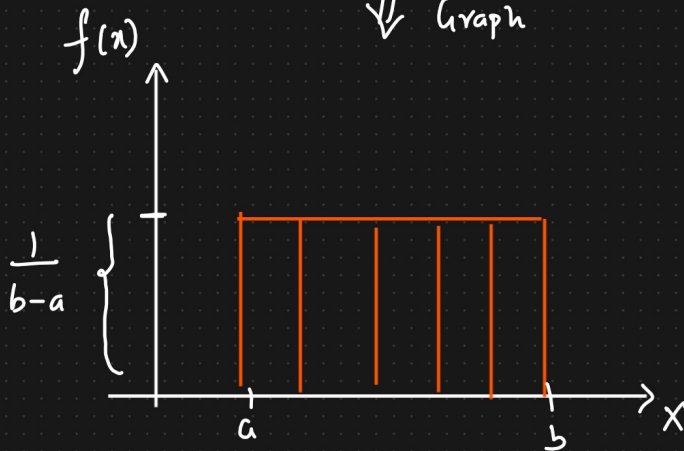
In Uniform Distribution the probability of getting the outcome is equal

This forms the basis.

A variable  $X$  is said to be uniformly distributed

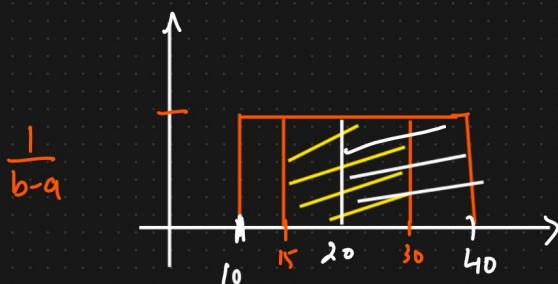
$$f(x) = \frac{1}{b-a} \quad \text{for } -\infty < a \leq x \leq b < \infty$$

⇓ Graph



- ⊛ The number of candies sold daily at a show is uniformly distributed with a maximum of 40 and minimum of 10.

i) Probability of daily sales to fall between 15 and 30?



$$x_1 = 15$$

$$x_2 = 30$$

$$\begin{aligned}
 P_r(15 \leq x \leq 30) &= (x_2 - x_1) * \frac{1}{(b-a)} \\
 &= (30 - 15) * \frac{1}{30} \\
 &= 15 * \frac{1}{30} = 0.5 //
 \end{aligned}$$

$$\begin{aligned}
 P_r(x \geq 20) &= (40 - 20) * \frac{1}{30} & x_1 = 20 \\
 &= 20 * \frac{1}{30} = 0.666 \Rightarrow 66\% & x_2 = 40
 \end{aligned}$$

### Mean and Variance of Uniform Distribution

$$\begin{aligned}
 \text{Mean} \rightarrow E(x) &= (a+b)/2 = (40+10)/2 \\
 &= 25
 \end{aligned}$$

$$\text{Variance} \rightarrow V(x) = (b-a)^2/12$$