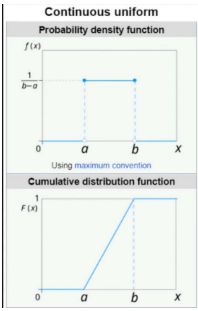
UNIFORM DISTRIBUTION [Continus Random Variable]

1) Continus Uniform Distribution (PDF)
2) Discrete Uniform Distribution (PMF)

1) Continus uniform Distribution

In probability theory and statistics, the continuous uniform distributions or rectangular distributions are a family of symmetric probability distribution. Such a distribution describes an experiment where there is an arbitrary outcome that lies betweeen certain bounds. The bounds are defined by the parameters, a and b which are the minimum and maximum values.



Notation : $U(a,b)$

Parameters : $-\infty < a < b < \infty$

PDF $\begin{cases} \frac{1}{b-a} & x \in [a,b] \\ 0 & \text{otherwise} \end{cases}$

CDF $\begin{cases} 0 & \text{for } x < a \\ \frac{x-a}{a-b} & \text{for } x \in [a,b] \\ 1 & \text{for } x > b \end{cases}$

Mean $= \frac{1}{2}(a+b)$

Median $= \frac{1}{2}(a+b)$

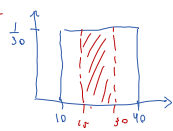
Variance $= \frac{1}{12}(b-a)^2$

Example

The number of candies sold daily of a shop is uniformly distributed with a maximum of 40 candies and a minimum of 10

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

Answer



$X_1 = 15$

$X_2 = 30$

$Pr(15 \le X \le 30) = (X_2 - X_1) * \frac{1}{b-a}$

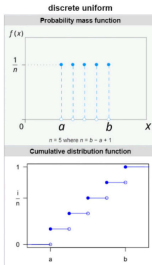
$= (30-15) * \frac{1}{30}$

$= 0.5$

$Pr(X \ge 20) = (40-20) \times \frac{1}{30} = 0.66$

2) Discrete Uniform Distribution

In probability theory and statistics, the discrete uniform distribution is a symmetric probability distribution, Wherein a finite number of values are equally likely to be observed; every one of n values has equal probability 1/n. Another way of sayin." Discrete uniform distribution" Would be a "known, finite number of outcomes equally like to happen".



1) Discrete Random Variable
2) PMF

Example Rolling / Fail a dice (1, 2, 3, 4, 5, 6)

$Pr(1) = 1/6$

$Pr(2) = 1/6$

$Pr(3) = 1/6$

$Pr(4) = 1/6$

$1/n \Rightarrow n = b - a + 1$

$= 6 - 1 + 1 = 6$

Notation $U(a,b)$

Parameters a, b where $b \ge a$

PMF $1/n$

Mean / Median $\frac{a+b}{2}$