Distribution Overview

	Uniform(Continuous)	Binomial(Discrete)	Poisson(Discrete)	Normal(Continuous)	CRVs(Continuous)
Conditions	All outcomes have the same probability	• There are a fixed number of trials • There are two outcomes • Each trial is independent • The probability of success is constant	• Events occur at random • Events are independent • Constant rate of occurrence • No simultaneous events	Probabilities symmetrical about the mean	None
Notation	$\mathcal{U}(a,b)$	$B(n,p)$	$P_o(\lambda)$	$\mathcal{N}(\mu,\sigma^2)$	$f(x)=\begin{cases} f(x), & \text{for } a\leq x\leq b \\ 0, & \text{otherwise}\end{cases}$
Parameters	a= Start value b= End value	n= Number of trials p= Probability of success	λ= Mean number of occurrences in the time period	μ= Mean σ= Standard Deviation	a= Start value b= End value
PDF or PMF	$f(x)=\begin{cases} \frac{1}{b-a}, & \text{for } a\leq x\leq b \\ 0, & \text{otherwise}\end{cases}$	$f(r)=\begin{cases} \binom{n}{r}p^r(1-p)^{n-r}, & \text{for } 0\leq r\leq n \\ 0, & \text{otherwise}\end{cases}$	$f(r)=\begin{cases} \frac{e^{-\lambda}\lambda^k}{k!}, & \text{for } 0\leq r\leq n \\ 0, & \text{otherwise}\end{cases}$		Given in question or: $\frac{dy}{dx}F(x)$
CDF	$f(x)=\begin{cases} 0, & \text{for } x<a \\ \frac{x-a}{b-a}, & \text{for } a\leq x<b \\ 1, & \text{for } x\geq b\end{cases}$	Use tables	Use tables	$z=\frac{x-\mu}{\sigma}$ Then use tables	$F(x)=\int_a^x f(x)dx$
Mean	$\frac{1}{2}(a+b)$	np	λ	μ	$\int_a^b xf(x)dx$
Variance	$\frac{1}{12}(b-a)^2$	$np(1-p)$	λ	σ^2	$\int_a^b x^2f(x)dx-\mu^2$
Median	$\frac{1}{2}(a+b)$			μ	Where F(x)=0.5
Mode	Any Value			μ	Where $f'(x)=0$
$\approx$ Binomial				$P=1-\frac{\sigma^2}{\mu}$ $n=\frac{\mu}{P}$	
$\approx$ Poisson		**Where p $<$ 0.1 and n $>$ 50** $X\sim B(n,p)\approx Y\sim P_o(np)$			
$\approx$ Normal		**Where n $>$ 10 and P $<$ 0.5** $X\sim B(n,p)\approx\mathcal{N}\big(np,np(1-p)\big)$ Don't forget continuity correction	**Where $\lambda>10$** $X\sim P_o(\lambda)\approx\mathcal{N}(\lambda,\lambda)$ Don't forget continuity correction		