LIST OF DISTRIBUTIONS

Distribution	Variable Definition	PMF/PDF	E(X)	VAR(X)	MGF
DISCRETE					
1.**Uniform** ~DU(N)		$\frac{1}{N} I_{\{1,2,\ldots,N\}}(x)$	$\frac{N+1}{2}$	$\frac{N^2-1}{12}$	$\sum_{j=1}^{N} e^{jt}\frac{1}{N}$
2. **Bernoulli** ~Be(p)	X = $\begin{cases} 0, & failure \\ 1, & success \end{cases}$	$p^x(1-p)^{1-x} I_{\{0,1\}}(x)$	p	$p(1-p) = pq$	$pe^t + q$
3. **Binomial** ~Bi(n,p)	X = number of successes	$\binom{n}{x} p^x (1-p)^{n-x} I_{\{0,1,2,..,n\}}(x)$	np	npq	$(pe^t+q)^n$
4. **Hyper-geometric** ~Hyp(n,N,K)	X = number of success in the sample	$\frac{\binom{K}{x}\binom{N-K}{n-x}}{\binom{N}{n}} I_{\{0,1,2,..,min(n,K\}}(x)$	$\frac{nK}{N}$	$\frac{nK}{N}(1-\frac{K}{N})(\frac{N-n}{N-1})$	
5. **Poisson** ~Po(λ)	X = number of occurrences in a time period	$\frac{e^{-\lambda}\lambda^x}{x!} I_{\{0,1,2,\ldots\}}(x)$	λ	λ	$\exp\{\lambda(\mathrm{e}^{\mathrm{t}}-1)\}$
6. **Geometric** ~Ge(p)	X = number of failures before the first success	$p(1-p)^x I_{\{0,1,2,\ldots\}}(x)$	$\frac{q}{p}$	$\frac{q}{p^2}$	$\frac{p}{(1-qe^t)}$
Geometric by Mendenhall ~Ge(p)	X= number of trials until the first success	$p(1-p)^{x-1} I_{\{1,2,\ldots\}}(x)$	$\frac{1}{p}$	$\frac{1}{p^2}$	$\frac{pe^t}{(1-qe^t)}$
7. **Negative Binomial** ~NB(r,p)	X = number of failures before the rth success	$\binom{r+x-1}{x} p^r(1-p)^x I_{\{0,1,2,\ldots\}}(x)$	$\frac{rq}{p}$	$\frac{rq}{p^2}$	$(\frac{p}{1-qe^t})^r$
Negative Binomial by Mendenhall ~NB(r,p)	X= number of trials until the rth success	$\binom{x-1}{r-1} p^r(1-p)^{x-r} I_{\{r+1,r+2,\ldots\}}(x)$	$\frac{r}{p}$	$\frac{r}{p^2}$	$(\frac{pe^t}{1-qe^t})^r$
CONTINUOUS					
1.**Uniform** ~U(a,b)	X is selected at random from an interval [a,b]	$\frac{1}{b-a} I_{[a,b]}(x)$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{bt}-e^{at}}{(b-a)t}$
2. **Normal** ~N(μ,σ^2)		$\frac{1}{\sqrt{2\pi}\,\sigma}\exp\left\{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right\} I_{(-\infty,\infty)}$	μ	σ^2	$\exp\{\mu t + \frac{1}{2}\sigma^2 t^2\}$
3. **Exponential** ~Exp(λ)	X can be thought of as the waiting time for the next success	$\lambda e^{-\lambda x} I_{[0,\infty)}(x)$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$	$\frac{\lambda}{\lambda-t}$, t < λ
4. **Gamma** ~Gamma(r,λ)	X can be thought of as the waiting time for the rth success	$\frac{\lambda^r}{\Gamma(r)} x^{r-1} e^{-\lambda x} I_{[0,\infty)}(x)$ Where $\Gamma(r) = (r-1)!$	$\frac{r}{\lambda}$	$\frac{r}{\lambda^2}$	$\left(\frac{\lambda}{\lambda-t}\right)^r$, t < λ
5. **Beta** ~Beta(α,β)		$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1} I_{0,1}(x)$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$	