Distribution	**PDF**	**Support**	**Mean**	**Variance**	**MGF**
Discrete Distributions					
Bernoulli	$p^x(1-p)^{1-x}$	$x \in \{0,1\}$	p	$p(1-p)$	$(1-p)+pe^t$
Binomial	$\binom{n}{x}p^x(1-p)^{n-x}$	$0 \leq x \leq n$	np	$np(1-p)$	$[(1-p)+pe^t]^n$
Geometric (Failures, “before”)	$p(1-p)^x$	$x \geq 0$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$\frac{p}{(1-(1-p)e^t)}, t < -\ln(1-p)$
Geometric (Trails, ”until”)	$p(1-p)^{x-1}$	$x \geq 1$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$\frac{pe^t}{(1-(1-p)e^t)}, t < -\ln(1-p)$
Negative Binomial (Failures, ”before”)	$\binom{x+r-1}{r-1}p^r(1-p)^x$	$x \geq 0$	$\frac{r(1-p)}{p}$	$\frac{r(1-p)}{p^2}$	$[\frac{p}{(1-(1-p)e^t)}]^r, t < -\ln(1-p)$
Negative Binomial (Trails, ”until”)	$\binom{x-1}{r-1}p^r(1-p)^{x-r}$	$x \geq r$	$\frac{r}{p}$	$\frac{r(1-p)}{p^2}$	$[\frac{pe^t}{(1-(1-p)e^t)}]^r, t < -\ln(1-p)$
Hypergeometric	$\frac{\binom{k}{x}\binom{N-k}{n-x}}{\binom{N}{n}}$	$max(0, n-N+k) \leq x \leq min(n,k)$	$\frac{nk}{N}$	$\frac{nk(N-k)(N-n)}{N^2(N-1)}$	
Poisson	$\frac{\lambda^x e^{-\lambda}}{x!}$	$x \geq 0$	λ	λ	$e^{\lambda(e^t-1)}$
Uniform Discrete	$\frac{1}{n}$	$a \leq x \leq b$	$\frac{a+b}{2}$	$\frac{n^2-1}{12}$	$\frac{e^{at}-e^{(b+1)t}}{n(1-e^t)}$
Continuous Distributions					
Normal	$\frac{1}{\sigma\sqrt{2\pi}}e^{-\frac{1}{2}(\frac{x-\mu}{\sigma})^2}$	$-\infty \leq x \leq \infty$	μ	σ^2	$e^{\mu t+\frac{\sigma^2 t^2}{2}}$
Exponential (Gamma with $\alpha = 1$)	$\lambda e^{-\lambda x}$	$x \geq 0$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$	$\frac{1}{1-\frac{t}{\lambda}}, t < \lambda$
Gamma	$\frac{1}{\Gamma(\alpha)\beta^\alpha}x^{\alpha-1}e^{-\lambda x}$	$x \geq 0$	$\alpha\beta$	$\alpha\beta^2$	$[\frac{1}{1-\frac{t}{\lambda}}]^\alpha, t < \lambda$
Uniform Continuous	$\frac{1}{b-a}$	$a \leq x \leq b$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{tb}-e^{ta}}{t(b-a)}$
Beta	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)}x^{\alpha-1}(1-x)^{\beta-1}$	$x \in \{0,1\}$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$	
Chi-square (Gamma, $\alpha = \frac{1}{2}$, $\beta = 2$)	$\frac{1}{\Gamma(\frac{\upsilon}{2})2^{\frac{\upsilon}{2}}}x^{\frac{\upsilon}{2}-1}e^{-\frac{x}{2}}$	$x \geq 0$	υ	2υ	$(1-2t)^{-\frac{\upsilon}{2}}, t < \frac{1}{2}$