

Distribution Sheet¹

Name	pdf	μ	σ^2	MGF
Discrete Uniform	$\frac{1}{k}$	$\sum x_i \cdot \frac{1}{k}$	$\sum (x_i - \mu)^2 \cdot \frac{1}{k}$	**
Bernoulli	$\theta^x(1 - \theta)^{1-x}$	θ	$\theta(1 - \theta)$	$1 - \theta + \theta e^t$
Binomial	$\binom{n}{x} \theta^x (1 - \theta)^{n-x}$	$n\theta$	$n\theta(1 - \theta)$	$[1 + \theta(e^t - 1)]^n$
Negative Binomial	$\binom{x-1}{k-1} \theta^k (1 - \theta)^{x-k}$	$\frac{k}{\theta}$	$\frac{k}{\theta} \left(\frac{1}{\theta} - 1 \right)$	$\left(\frac{\theta e^t}{1 - (1 - \theta)e^t} \right)^k$
Geometric	$\theta(1 - \theta)^{x-1}$	$\frac{1}{\theta}$	$\frac{1 - \theta}{\theta^2}$	$\frac{\theta e^t}{1 - (1 - \theta)e^t}$
Hypergeometric	$\frac{\binom{M}{x} \binom{N-M}{n-x}}{\binom{N}{n}}$	$n \frac{M}{N}$	$\frac{nM(N-M)(N-n)}{N^2(N-1)}$	**
Poisson	$\frac{\lambda^x e^{-\lambda}}{x!}$	λ	λ	$e^{\lambda(e^t - 1)}$
Uniform	$1/(\beta - \alpha)$	$(\alpha + \beta)/2$	$\frac{1}{12}(\beta - \alpha)^2$	$\frac{e^{t\beta} - e^{t\alpha}}{t(\beta - \alpha)}$
Gamma	$\frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\beta}$	$\alpha\beta$	$\alpha\beta^2$	$(1 - \beta t)^{-\alpha}$
χ^2	$\frac{1}{2^{\nu/2} \Gamma(\frac{\nu}{2})} x^{\frac{\nu-2}{2}} e^{-x/2}$	ν	2ν	$(1 - 2t)^{-\nu/2}$
Exponential	$\frac{1}{\theta} e^{-x/\theta}$	θ	θ^2	$\frac{1}{1 - \theta t}$
Normal	$\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$	μ	σ^2	$e^{\mu t + \frac{1}{2}\sigma^2 t^2}$

** : Formulas exist but aren't terribly useful for us.

¹With χ^2 added Dec 5 2008