Name	Parameters	Distribution Notation	PMF/PDF	Support	Mean	Variance	MGF
Bernoulli	$p \in [0,1]$	Bern(p)	$p^x(1-p)^{1-x}$	$x = 0, 1$	p	$p(1-p)$	$(1-p) + pe^t$
Binomial	$n \in \mathbb{N}, p \in [0,1]$	Bin(n,p)	$\binom{n}{x} p^x (1-p)^{n-x}$	$x = 0, \dots, n$	np	$np(1-p)$	$((1-p) + p^t)^n$
Uniform	$a, b, \in \mathbb{Z}, a < b$	$U(\{a, \dots, b\})$	$1/(b-a)$	$x = a, \dots, b$	$(a+b)/2$	$\frac{(b-a+1)^2-1}{12}$	$\frac{e^{at}-e^{(b+a)t}}{(b-a)(1-e^t)}$
Geometric*	$p \in [0,1]$	$Geom(p)$	$p(1-p)^{x-1}$	$x = 1, 2, \dots$	$1/p$	$(1-p)/p^2$	$\frac{pe^t}{(1-(1-p)e^t}$
Geometric*	$p \in [0,1]$	$Geom_0(p)$	$p(1-p)^x$	$x = 0, 1, \dots$	$(1-p)/p$	$(1-p)/p^2$	$\frac{p}{(1-(1-p)e^t)}$
Poisson	$\lambda > 0$	$Pois(\lambda)$	$e^{-\lambda}\lambda^x/x!$	$x = 0, 1, \dots$	λ	λ	$\exp(\lambda(e^t - 1))$
Beta	$\alpha, \beta > 0$	$Beta(\alpha, \beta)$	$\frac{x^{\alpha-1}(1-x)^{\beta-1}}{B(\alpha,\beta)}$	$0 \leq x \leq 1$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$	
Chi squared	$k > 0$	$\chi^2(k)$	$\frac{x^{k/2-1}e^{-x/2}}{\Gamma(k/2)2^{k/2}}$	$x > 0$	k	$2k$	$(1-2t)^{-k/2}$
Exponential*	$\lambda > 0$	$Exp(\lambda)$	$\lambda e^{-\lambda x}$	$x > 0$	$1/\lambda$	$1/\lambda^2$	$(1-t/\lambda)^{-1}$
Exponential*	$\beta > 0$	$Exp(\beta)$	$\frac{1}{\beta}e^{-x/\beta}$	$x > 0$	β	β^2	$(1-\beta t)^{-1}$
Gamma*	$k, \lambda > 0$	$Gamma(k, \lambda)$	$\frac{\lambda^k x^{k-1} e^{-\lambda x}}{\Gamma(k)}$	$x > 0$	k/λ	k/λ^2	$(1-t/\lambda)^{-k}$
Gamma*	$k, \theta > 0$	$Gamma(k, \theta)$	$\frac{x^{k-1}e^{-x/\theta}}{\theta^k \Gamma(k)}$	$x > 0$	$k\theta$	$k\theta^2$	$(1-t\theta)^{-k}$
Normal	$\mu \in \mathbb{R}, \sigma^2 > 0$	$N(\mu, \sigma^2)$	$\frac{\exp(-\frac{1}{2\sigma^2}(x-\mu)^2)}{\sqrt{2\pi\sigma^2}}$	$x \in \mathbb{R}$	μ	σ^2	$\exp(\mu t + \sigma^2 t^2/2)$
Uniform	$a, b \in \mathbb{R}, a < b$	$Unif(a, b)$	$1/(b-a)$	$a < x < b$	$(a+b)/2$	$(b-a)^2/12$	$\frac{e^{bt}-e^{at}}{(b-a)t}$

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1. Gamma/Beta Functions

(1) $\Gamma(n) = (n-1)!$ when n is an integer.
(2) $\Gamma(x+1) = x\Gamma(x)$ for any $x > 0$.
(3) $\Gamma(1/2) = \sqrt{\pi}$
(4) $B(\alpha, \beta) = \Gamma(\alpha)\Gamma(\beta)/\Gamma(\alpha+\beta)$

2. Order Statistics

If $X_1, \ldots X_N \overset{iid}{\sim} f$ where the X_n are continuous with pdf f and CDF F then

(1)
$$f_{X_{(1)}}(t) = N(1 - F(t))^{N-1} f(t)$$

(2)
$$f_{X_{(N)}}(t) = NF(t)^{N-1} f(t)$$