## **Summary of Distributions**

Name	Support	p.d.f p.m.f.	Mean	Variance	m.g.f.
Discrete Uniform	$x=x_1,\ldots,x_k$	$\frac{1}{k}$	$\frac{1}{k} \sum x_i$	$\frac{1}{k}\sum (x_i - \mu)^2$	$\frac{1}{k}\sum e^{tx_i}$
$\mathbf{Bernoulli} \\ (1,\theta)$	x = 0, 1	$\theta^x (1-\theta)^{1-x}$	θ	$\theta(1-\theta)$	$e^t\theta + (1-\theta)$
$\begin{array}{c} \textbf{Binomial} \\ (n, \theta) \end{array}$	$x = 0, 1, \dots, n$	$\binom{n}{x}\theta^x(1-\theta)^{n-x}$	$n\theta$	$n\theta(1-\theta)$	$\left(e^t\theta + (1-\theta)\right)^n$
$\begin{array}{c} \textbf{Geometric} \\ (\theta) \end{array}$	$x = 1, 2, \dots$	$\theta(1-\theta)^{x-1}$	$\frac{1}{\theta}$	$\frac{1-\theta}{\theta^2}$	$\frac{\theta e^t}{1 - e^t (1 - \theta)}$
$egin{aligned} \mathbf{Negative} \ \mathbf{Binomial} \ (k,  heta) \end{aligned}$	$x = k, k + 1, \dots$	$\binom{x-1}{k-1}\theta^k(1-\theta)^{x-k}$	$rac{k}{ heta}$	$\frac{k(1-\theta)}{\theta^2}$	$\frac{\theta e^t}{(1-e^t(1-\theta))^k}$
$ \begin{array}{c} \textbf{Hypergeometric} \\ (N,n,k) \end{array} $	$x \le k$ $n - x \le N - k$	$\frac{\binom{k}{x}\binom{N-k}{n-x}}{\binom{N}{n}}$	$\frac{nk}{N}$		
$\begin{array}{c} \textbf{Poisson} \\ (\lambda) \end{array}$	$x = 0, 1, \dots$	$\frac{e^{-\lambda}\lambda^x}{x!}$	λ	λ	$e^{\lambda(e^t-1)}$
$egin{aligned} \mathbf{Continuous} \ \mathbf{Uniform} \ (lpha,eta) \end{aligned}$	$\alpha < x < \beta$	$\frac{1}{\beta - \alpha}$	$\frac{\alpha+\beta}{2}$	$\frac{(\beta - \alpha)^2}{12}$	$\frac{e^{t\beta} - e^{t\alpha}}{t(\beta - \alpha)}$
$ \begin{array}{c} \textbf{Exponential} \\ (\theta) \end{array}$	x > 0	$\frac{1}{\theta}e^{-x/\theta}$	θ	$ heta^2$	$(1-t\theta)^{-1}$
$\mathbf{Gamma} \\ (\alpha,\beta)$	x > 0	$\frac{1}{\Gamma(\alpha)\beta^{\alpha}}x^{\alpha-1}e^{-x/\beta}$	lphaeta	$lphaeta^2$	$(1-\beta t)^{-\alpha}$
$egin{aligned} \mathbf{Normal} \ (\mu,\sigma^2) \end{aligned}$	$-\infty < x < \infty$	$\frac{1}{\sqrt{2\pi}\sigma}e^{-(x-\mu)^2/2\sigma^2}$	μ	$\sigma^2$	$e^{\mu t + \sigma^2 t^2/2}$