Table of Distributions

Name	PDF	Domain	Parameters	E	Var	MGF
Binomial	$\binom{n}{k}p^k(1-p)^{n-k}$	$0 \le k \le n$	$p \in (0,1), n \in \mathbb{N}$	np	$np(1-p)$	$(1-\theta+\theta e^t)^n$
Poisson	$\frac{\lambda^k}{k!}e^{-\lambda}$	$k \in \mathbb{N}$	$\lambda > 0$	λ	λ	$e^{\lambda(e^t-1)}$
Normal	$\frac{1}{\sqrt{2\pi}\sigma}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$	$x \in \mathbb{R}$	$\mu \in \mathbb{R}, \sigma > 0$	μ	σ^2	$e^{\mu t+\frac{\sigma^2 t^2}{2}}$
Gamma	$\frac{x^{r-1}\lambda^r}{e^{\lambda x}\Gamma(r)}$	$x > 0$	$r > 0, \lambda > 0$	$\frac{r}{\lambda}$	$\frac{r}{\lambda^2}$	$\left(1-\frac{t}{\lambda}\right)^{-r}$
t	$\frac{\Gamma\left(\frac{n+1}{2}\right)}{\sqrt{n\pi}\Gamma\left(\frac{n}{2}\right)}\left(1+\frac{x^2}{n}\right)^{-\frac{n+1}{2}}$	$x \in \mathbb{R}$	$t \in \mathbb{N}$	0	?	?
F	$\frac{\Gamma\left(\frac{m+n}{2}\right)m^{\frac{m}{2}}n^{\frac{n}{2}}w^{\frac{m}{2}-1}}{\Gamma\left(\frac{m}{2}\right)\Gamma\left(\frac{n}{2}\right)(n+mw)^{\frac{m+n}{2}}}$	$w > 0$	$m, n \in \mathbb{N}$, ?	?	?	?

Notes:

1. A binomial Random variable with $n = 1$ is called a Bernoulli random variable.
2. A Gamma distribution with $r = 1$ is call a Exponential random variable with rate λ.
3. If $n \in \mathbb{N}$ then a Gamma distribution with $r = \frac{n}{2}$ and $\lambda = \frac{1}{2}$ is called a χ^2_n-distribution.

Other Facts:

1. Suppose $X_1, X_2, \ldots, X_m \overset{\text{iid}}{\sim} N(\mu_X, \sigma^2)$ and are independent to $Y_1, Y_2, \ldots, Y_n \overset{\text{iid}}{\sim} N(\mu_Y, \sigma^2)$. Let $\overline{X}_m$, $\overline{Y}_n$, S_X, and S_Y have their usual meaning. Then:
$$\frac{\overline{X}_m - \overline{Y}_n - (\mu_X - \mu_Y)}{S_p\sqrt{\frac{1}{m}+\frac{1}{n}}} \sim t_{m+n-2}$$
where $S_p^2 = \frac{(m-1)S_X^2 + (n-1)S_Y^2}{m+n-2}$.

2. Suppose $X_1, X_2, \ldots, X_m \overset{\text{iid}}{\sim} N(\mu_X, \sigma_X^2)$ and are independent to $Y_1, Y_2, \ldots, Y_n \overset{\text{iid}}{\sim} N(\mu_Y, \sigma_Y^2)$. Then:
$$\frac{\overline{X}_m - \overline{Y}_n - (\mu_X - \mu_Y)}{\sqrt{\frac{S_X^2}{m}+\frac{S_Y^2}{n}}} \dot{\sim} t_\nu$$
where ν is the closest integer to:
$$\frac{\left(\hat{\theta}+\frac{m}{n}\right)^2}{\frac{\hat{\theta}^2}{m-1}+\frac{1}{n-1}\left(\frac{m}{n}\right)^2},$$
$\hat{\theta} = \frac{S_X}{S_Y}$, and $\dot{\sim}$ means "approximately distributed as."

3. If A is an orthogonal $n \times n$ matrix (i.e. $A^T A = I_n$) and $Z_1, Z_2, \ldots Z_n \overset{\text{iid}}{\sim} N(0,1)$ and:
$$\begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{bmatrix} = A \begin{bmatrix} Z_1 \\ Z_2 \\ \vdots \\ Z_n \end{bmatrix}.$$
then: $X_1, X_2, \ldots X_n \overset{\text{iid}}{\sim} N(0,1)$.