Formulas:

$f(x) = \binom{n}{x} p^x (1-p)^{n-x}$ for $x = 0, 1, 2, \ldots, n$ $E(X) = np$ $Var(X) = np(1-p)$

$f(x) = \binom{x+r-1}{r-1} p^r (1-p)^x$ for $x = 0, 1, 2, \ldots$ $E(X) = \frac{r(1-p)}{p}$ $Var(X) = \frac{r(1-p)}{p^2}$

$f(x) = \frac{\binom{M}{x}\binom{N-M}{n-x}}{\binom{N}{n}}$ for $\max(0, n-N+M) \leq x \leq \min(n, M)$ $E(X) = n\frac{M}{N}$ $Var(X) = n\frac{M}{N}\left(\frac{N-n}{N-1}\right)\left(1-\frac{M}{N}\right)$

$f(x) = \frac{e^{-\lambda}\lambda^x}{x!}$ for $x = 0, 1, 2, \ldots$ $E(X) = \lambda$ $Var(X) = \lambda$

$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$ for $-\infty < x < \infty$ $E(X) = \mu$ $Var(X) = \sigma^2$

$f(x) = \lambda e^{-\lambda x}$ for $x \geq 0$ $E(X) = \frac{1}{\lambda}$ $Var(X) = \frac{1}{\lambda^2}$

R code:

```
mean(x)    mean(x,trim=p)    var(x)    sd(x)    summary(x)    hist(x)    choose(n,k)    factorial(k)
p=c(p1,p2,...,pn)    x=c(x1,x2,...,xn)    sum(x*p)    sum(x^2*p)-sum(x*p)^2
dbinom(x,size=n,prob=p)    pbinom(x,size=n,prob=p)    qbinom(q,size=n,prob=p)
dnbinom(x,size=r,prob=p)    pnbinom(x,size=r,prob=p)    qnbinom(q,size=r,prob=p)
dhyper(x,m,n,k)    phyper(x,m,n,k)    qhyper(p,m,n,k)
dpois(x,lambda=λ)    ppois(x,lambda=λ)    qpois(p,lambda=λ)
dnorm(z,mean=μ,sd=σ)    pnorm(z,mean=μ,sd=σ)    qnorm(p,mean=μ,sd=σ)
dexp(x,rate=λ)    pexp(x,rate=λ)    qexp(p,rate=λ)
```