| | PMF/PDF $f(x)$ | CDF $F(x)$ | Mean | Variance |
|---|---|---|---|---|
| Uniform(a, b) | $\frac{1}{b-a}, b > a$ | $\frac{x-a}{b-a}$ | $\frac{a+b}{2}$ | $\frac{(a-b)^2}{12}$ |
| Bernoulli(p) | $\begin{cases} p, x = 1 \\ 1-p, x = 0 \end{cases}$ | $\begin{cases} 0, x < 0 \\ 1-p, 0 \le x < 1 \\ 1, x \ge 1 \end{cases}$ | $p$ | $p(1-p)$ |
| Binomial(n, p) | $\binom{n}{x} p^x (1-p)^{n-x}$ | $\sum_{k=0}^{x} f(k)$ | $np$ | $np(1-p)$ |
| Negative Binomial (r, p) | $\binom{k+r-1}{r-1} p^{r-1}(1-p)^k p$ | $\sum_{k=0}^{x} f(k)$ | $\frac{r(1-p)}{p}$ | $\frac{r(1-p)}{p^2}$ |
| Geometric (n, p) | $(1-p)^{x-1}p$ | $1-(1-p)^x$ | $\frac{1}{p}$ | $\frac{1-p}{p^2}$ |
| Poisson ($\lambda$) | $\frac{\lambda^k}{k!} e^{-\lambda}$ | $e^{-\lambda} \sum_{i=0}^{k} \frac{\lambda^i}{i!}$ | $\lambda$ | $\lambda$ |
| Exponential ($\lambda$) | $\lambda e^{-\lambda x}$ | $1-e^{-\lambda x}$ | $\frac{1}{\lambda}$ | $\frac{1}{\lambda^2}$ |
| Normal ($\mu, \sigma$) | $\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-u)^2}{2\sigma^2}}$ | $\frac{1}{2}\left[1 + erf\left(\frac{x-\mu}{\sigma\sqrt{2}}\right)\right]$ | $\mu$ | $\sigma^2$ |

Gamma function $\Gamma(n) = \int_0^\infty x^{z-1} e^{-x}\, dx = (n-1)!$
Recursive property: $\Gamma(1) = 1, \Gamma(n+1) = n\Gamma(n)$