The Binomial Distribution

$$f(x) = \binom{n}{x} p^x (1-p)^{n-x}, \quad x = 0,1,\ldots,n$$

The Geometric Distribution

$$f(x) = p(1-p)^{x-1}, \quad x = 1,2,\cdots$$

The Negative Binomial Distribution

$$f(x) = \binom{x-1}{r-1} p^r (1-p)^{x-r}, \quad x = r, r+1, r+2, \cdots$$

The Hypergeometric Distribution

$$f(x) = \binom{K}{x}\binom{N-K}{n-x} \div \binom{N}{n}, \quad \max\{0, n-(N-K)\} \le y \le \min\{n, K\}$$

The Poisson Distribution

$$f(x) = \frac{\lambda^x}{x!} e^{-\lambda}, \quad x = 0,1,\ldots$$

The Normal Distribution

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

The Exponential Distribution:

$$f(x) = \lambda e^{-\lambda x}, \quad x \ge 0$$

The Gamma Distribution

$$f(x) = \frac{\lambda\, e^{-\lambda x} (\lambda x)^{\alpha-1}}{\Gamma(\alpha)}, \quad x \ge 0, \quad \Gamma(\alpha) = \int_0^\infty e^{-y} y^{\alpha-1} dy$$

The Weibull Distribution

$$F(x) = 1 - e^{-\left(\frac{x-\nu}{\alpha}\right)^\beta}, \quad x > \nu$$

The Beta Distribution

$$f(x) = \frac{x^{a-1}(1-x)^{b-1}}{\mathrm{B}(a,b)}, \quad 0 < x < 1, \quad \mathrm{B}(a,b) = \int_0^1 x^{a-1}(1-x)^{b-1}\, dx$$

The Cauchy Distribution

$$f(x) = \frac{1}{\pi} \frac{1}{1+(x-\theta)^2}, \quad -\infty < x < \infty$$