# Facts about standard distributions

**Binomial distribution**

Parameters are $n$ and $p$. Range is the integers from 0 to $n$.

Probability mass function: $p(x) = \left( \begin{array}{c} n \\ x \end{array} \right) p^x (1-p)^{n-x}$

Mean: $E(X) = np$

Variance: $\mathrm{Var}(X) = np(1-p)$

**Geometric distribution**

Parameter is $p$. Range is the integers from 1 on up.

Probability mass function: $p(x) = p(1-p)^{x-1}$

Mean: $E(X) = 1/p$

Variance: $\mathrm{Var}(X) = (1-p)/p^2$

**Poisson distribution**

Parameter is $\mu$. Range is the integers from 0 on up.

Probability mass function: $p(x) = e^{-\mu}\mu^x/x!$

Mean: $E(X) = \mu$

Variance: $\mathrm{Var}(X) = \mu$

**Exponential distribution**

Parameter is $\lambda$. Range is the positive real numbers.

Probability density function: $f(x) = \lambda e^{-\lambda x}$

Mean: $E(X) = 1/\lambda$

Variance: $\mathrm{Var}(X) = 1/\lambda^2$

**Normal distribution**

Parameters are $\mu$ and $\sigma$. Range is the real numbers.

Probability density function: $f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2}$

Mean: $E(X) = \mu$

Variance: $\mathrm{Var}(X) = \sigma^2$