# Facts about standard distributions

## Binomial distribution

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

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

Mean: 
$$E(X) = np$$

Variance: 
$$Var(X) = np(1-p)$$

#### 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: 
$$Var(X) = (1 - p)/p^2$$

#### 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: 
$$Var(X) = \mu$$

### **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: 
$$Var(X) = 1/\lambda^2$$

## 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: 
$$Var(X) = \sigma^2$$