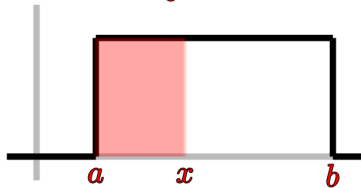


# Probability Distributions

Continuous

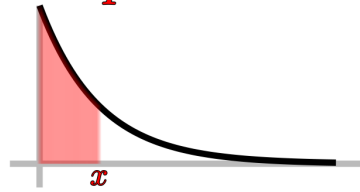
*Uniform*



$$\mu = \frac{a + b}{2} \quad \sigma = \sqrt{\frac{(b - a)^2}{12}}$$

$$P(X < x) = \frac{x - a}{b - a}$$

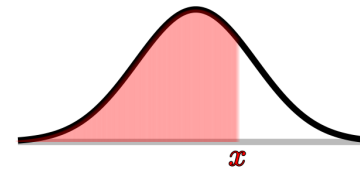
*Exponential*



$$\mu = \frac{1}{\gamma} \quad \sigma = \frac{1}{\gamma}$$

$$P(X < x) = 1 - e^{-\gamma x}$$

*Normal*



$$z = \frac{x - \mu}{\sigma}$$

$$P(X < x) \Rightarrow \text{Use Z-Chart}$$

**Key**

$\gamma$  = rate parameter

$z$  = z-score

$p$  = probability of success

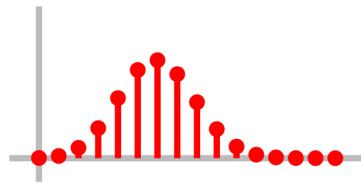
$n$  = # of trials

$N$  = population size

$K$  = # of success states

Discrete

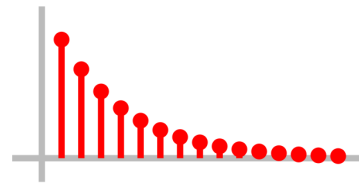
*Binomial*



$$\mu = n \cdot p \quad \sigma = \sqrt{n \cdot p \cdot (1 - p)}$$

$$P(X = x) = \binom{n}{x} p^x (1 - p)^{n-x}$$

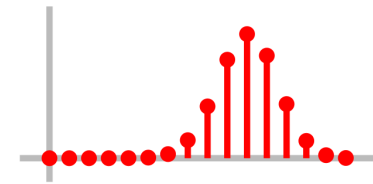
*Geometric*



$$\mu = \frac{1}{p} \quad \sigma = \frac{\sqrt{1 - p}}{p}$$

$$P(X = x) = (1 - p)^{x-1} p$$

*Hypergeometric*



$$\mu = n \frac{K}{N} \quad \sigma = \sqrt{n \frac{K(N - K)(N - n)}{N^2(N - 1)}}$$

$$P(X = x) = \frac{\binom{K}{x} \binom{N - K}{n - x}}{\binom{N}{n}}$$