Probability Distributions

Binomial Distribution
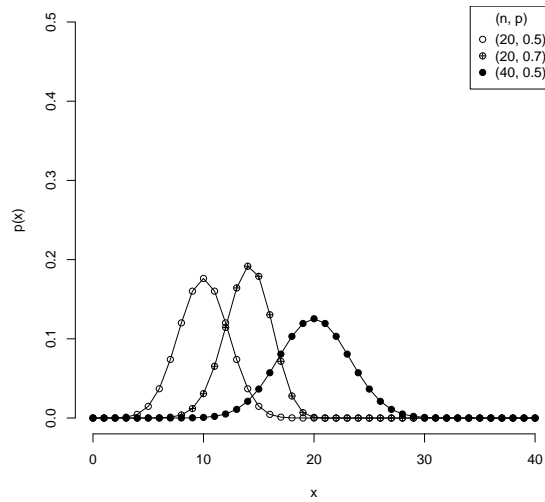
Figure 1: Binomial Distribution

$X \sim \text{Binomial}(n, p)$

$x = 0, 1, 2, \ldots, n$

$0 < p < 1$

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

$\mu = E[X] = np$

$\sigma^2 = E[(x - \mu)^2] = np(1 - p)$

Normal Distribution
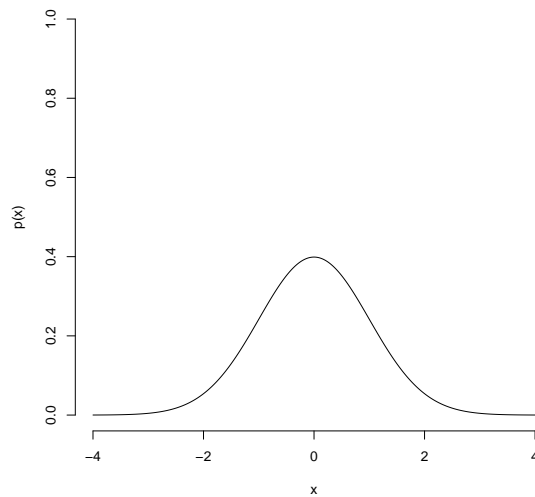

Figure 2: Normal$(0, 1)$ Distribution

$X \sim \text{Normal}(\mu, \sigma^2)$

$-\infty < x < \infty$

$-\infty < \mu < \infty$

$\sigma^2 > 0$

$p(x) = \dfrac{1}{\sqrt{2\pi\sigma^2}} \exp\left[-\dfrac{(x - \mu)^2}{2\sigma^2}\right]$

$\mu = E[X] = \mu$

$\sigma^2 = E[(x - \mu)^2] = \sigma^2$