

# Chapter 7

## Sampling Distribution

### 1 Distribution of the Sample Mean

#### 1.1 If Population $\sim$ Normal

Then the sampling distribution  $\sim$  normal with  $\mu_{\bar{x}} = \mu$  (regardless of sample size) and  $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

#### 1.2 If Population $\sim$ Non-Normal

Then the sampling distribution  $\sim$  normal if  $n \geq 30$  (by Central Limit Theorem) with  $\mu_{\bar{x}} = \mu$  and  $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ .

### 2 Distribution of the Sample Proportion

Then the sampling distribution  $\sim$  normal if  $np \geq 5$  and  $n(1 - p) \geq 5$  with  $\mu_{\hat{p}} = p$  and  $\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$ .