Ch 7 Review

(pg 358)

- a point estimate is our best guess for the unknown parameter value. An estimate of the population mean μ is the sample mean $\bar{x}$. An estimate for the population proportion p is $\hat{p}$.
- A confidence interval contains the most plausible values for a parameter. Confidence intervals for most parameters have the form

$$\text{Estimate} \pm \text{margin of error}, \quad \text{where}$$
$$\text{margin of error} = (z \text{ or } t \text{ score}) \times (se)$$

  and se is the standard error of the estimate. For the proportion, the score used is the z-score from the normal distribution. For the mean, the score is a t-score from the t distribution with degrees of freedom $df = n - 1$. The t-score is similar to a z-score when $df \geq 30$. See Table 7.6 in the text for a summary of this information.

- The z-score and t-scores depend on the confidence level, the probability that the method produces a confidence interval that contains the population parameter value. For a proportion for instance, since the probability of 0.95 falls within 1.9i6 standard errors of the center of the normal sampling distribution, we use $z = 1.96$ for 95% confidence.
- For estimating a mean, the t distribution accounts for the extra variability due to using the sample standard deviation s to estimate the population standard deviation in finding a standard error. The t method assumes that the population distribution is normal. This ensures that the sampling distribution of $\bar{x}$ is bell shaped. This assumption is mainly important for small n, because when n is large the central limit theorem guarantees that the sampling distribution is bell-shaped.
- For estimating a proportion, the formulas rely on the central limit theorem. For large random samples, this guarantees that the sample proportion has a normal sampling distribution.
- Before conducting a study, we can determine the sample size n necessary to achieve a certain margin of error. We must also guess a value for the estimate $\hat{p}$ or $\bar{x}$.