Third Examination Study Guide

1. What is a *standard error* and what is a *margin of error*?
2. What is the difference between *point* and *interval* estimation?
3. Understand the "anatomy" of a confidence interval (i.e., point estimate, standard score, standard error, and margin of error). Be able to identify each part of a confidence interval.
4. Be able to find/compute the point estimate, standard error, margin of error, and confidence interval when estimating p.
5. Be able to find/compute the point estimate, standard error, margin of error, and confidence interval when estimating μ (also know how to do this when sampling without replacement when N is known).
6. Be able to find/compute the point estimate, standard error, margin of error, and confidence interval when estimating τ when sampling without replacement.
7. What is meant by the *confidence level* of a confidence interval? How do you find the value of z or t for a specified confidence level?
8. What effect does increasing the *confidence level* have on the margin of error and the confidence interval? What effect does increasing the *sample size* have on the margin of error and the confidence interval?
9. How do you choose the sample size when estimating p with $\hat{p}$?
10. How do you choose the sample size when estimating μ with $\bar{x}$?
11. What is sampling *with* versus *without* replacement?
12. What do we need to *assume* when making inferences about μ, p, and τ using the methods we have discussed?
13. What is meant by saying that a statistic is *unbiased*? What does it mean to say that a statistic is *biased*?
14. What are the three sources of bias that we discussed in class?
15. When is the sampling distribution of $\bar{x}$ or $\hat{p}$ approximately normal in shape?
16. What is the *randomized response method*? How does it work? Why is it used?
17. As always, be comfortable with symbols/notation (e.g., μ, $\bar{x}$, p, $\hat{p}$, m, n, N, s, σ, τ).

Formulas/expressions you should understand when and how to use.

$$\sqrt{\hat{p}(1-\hat{p})/n} \qquad z\sqrt{\hat{p}(1-\hat{p})/n} \qquad \hat{p} \pm z\sqrt{\hat{p}(1-\hat{p})/n}$$

$$\frac{s}{\sqrt{n}} \qquad t\frac{s}{\sqrt{n}} \qquad \bar{x} \pm t\frac{s}{\sqrt{n}}$$

$$\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}} \qquad t\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}} \qquad \bar{x} \pm t\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}}$$

$$N\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}} \qquad tN\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}} \qquad N\bar{x} \pm tN\frac{s}{\sqrt{n}}\sqrt{1-\frac{n}{N}}$$

$$n = \frac{z^2 p(1-p)}{m^2} \qquad n = \frac{z^2\sigma^2}{m^2}$$

$$n-1 \qquad n\hat{p} \geq 15 \qquad n(1-\hat{p}) \geq 15$$