AMS102.03 Handout 6 Summary of Chapters 9 and 10

**Chapter 9 Inference on Population Proportion**

**Confidence Interval**

$$\hat{p} \pm z^*(\sqrt{\frac{\hat{p}(1-\hat{p})}{n}})$$

where $z^*$ varies according to the confidence levels.

Interpretation of 95% (or other confidence level) confidence intervals: among all 95% confidence intervals constructed from random samples, 95% of these intervals will cover the population parameter. So, for a particular confidence interval constructed for a simple random sample, we have 95% confidence that it covers the population parameters.

**Hypothesis Testing**

$$H_0 : p = p_0 \text{ versus } H_0 : p \begin{matrix} < \\ > \\ \neq \end{matrix} p_0$$

$$\text{Test Statistics} \quad Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

Determine the direction of extreme and obtain your P-values using the standard normal table. Make your decision and draw conclusions.

**Chapter 10 Inference on Population Mean**

**Confidence Interval**

- σ known: $\overline{x} \pm z^* \frac{\sigma}{\sqrt{n}}$
- σ unknown: $\overline{x} \pm t^* \frac{s}{\sqrt{n}}$. This formula is good when either sample size is large (>0) or the population is approximately normal. However, when sample size is large, $t^* \approx z^*$. The degree of freedom of $t^*$ is *n-1*.

**Hypothesis Testing**

$$H_0 : \mu = \mu_0 \text{ versus } H_0 : \mu \underset{\neq}{\overset{<}{>}} \mu_0$$

- σ known: Test statistic $Z = \dfrac{\overline{x} - \mu_0}{\sigma / \sqrt{n}}$, obtain p-values using the standard normal table.

- σ unknown:
    - Sample size is small and the population approximately normal: Use the test statistic $t = \dfrac{\overline{x} - \mu_0}{s / \sqrt{n}}$ which follows t-distribution with *df*=*n-1*. Obtain the bounds of p-values from the t-distribution table.
    - Sample size is large: Use the test statistic $t = \dfrac{\overline{x} - \mu_0}{s / \sqrt{n}}$ which is approximately standard normal *N(0,1)*. Obtain p-values using the standard normal table.
    - Small sample size and population not approximately normal: Not to be considered in this course.