STP226, Review notes for Test #2. (chapters 5-8)

1. **Know new vocabulary and symbolic notation :**

- **normally distributed variable ($X \sim N(\mu,\sigma)$)**
- **normal and standard normal distribution curves ($Z \sim N(0, 1)$)**
- **standardized version of normal variable, z-score: $z = (x-\mu)/\sigma$**
- **Empirical Rule (68.26- 95.44 - 99.74 rule)**
- Z_α
- **Point estimate of the population mean μ .**
- **confidence interval, confidence level, Margin of error (E)**
- **t distribution, degrees of freedom**

2. Remember our assumptions for CI :

1. **Normal populations or large samples for z or t interval procedures.**
2. **All samples are simple random samples**
3. **If we have small samples and no normality assumption, use nonparametric methods (There are some described in the book, we did not talk about them, so you may omit this topic)**

3. Chapter5

- **Know simple probability rules:**

  $P(A) = f/N$, $P(notA)=1-P(A)$, $P(AorB)= P(A)+P(B)-P(A\&B)$, $P(A) \in [0,1]$

- **Know what is the sample space, event, what are events: notA, AorB, A&B, be able to describe them in words and list (or count) their outcomes**
- **List sample spaces for simple experiments, like: Roll die once, 2 times, select a card from an ordinary deck, Toss two coins, 3 coins.**
- **Know when events are mutually exclusive.**
- **Know how to illustrate events using Venn diagrams**

  Compute probabilities from 1- way and 2-way frequency tables.

4. Chapter 6

- **Know the properties of normal and standard normal curves (Center at μ, symmetry, area=1, most area within 3 st. dev. about the mean, bell shape)**
- **Know how to find areas under standard normal and normal curves using tables, use symmetry .**
- **Be able to find percentiles, deciles, quartiles of normal and st. normal distributions**
- **Know how to find the x or z for given area.**
- **Know Empirical rule and how and when to use it.**
- **Know how to obtain and interpret z-scores (standard scores).**

- **Answer questions like:**
  1. **For normal population, what % is greater than a given value.**
  2. **P(X < 10) =? where X is normal variable with μ=4 and σ=2.**
  3. **For normal variable x, what is the value x, if area to the right of it is 45%.**
  4. **Find 17th percentile of normal distribution with μ=10 and σ=2.**

4. Chapter 7

- **Know what is the sampling distribution of the sample mean $\bar{X}$, know mean and standard deviation of $\bar{X}$ ($\mu_{\bar{X}}=\mu$ = and $\sigma_{\bar{X}}=\frac{\sigma}{\sqrt{n}}$. Know how the shape of the distribution changes with increasing sample size n.**
- **When $\bar{X}$ has normal distribution, when approximately normal distribution. Know Central Limit Theorem.**
- **What is the standard version of $\bar{X}$.**
- **Use the standard version of $\bar{X}$ to answer questions like:**

  What is P($\bar{X}$ > 14), where $\bar{X}$ is a sample mean of a sample of size 6 from normally distributed population with mean of 10 and std. deviation of 5.

5. Chapter 8

- **Know that $\bar{X}$ is a point estimate of μ .**
- **Know how to compute (1-α)x 100% Confidence Interval for μ**
  1. **when σ is known (Z-interval)**
  2. **when σ is unknown (t-interval)**
- **Interpret the CI**
- **What is the margin of error for a given CI, know how it changes with increased sample size and the same confidence level.**
- **Estimate the sample size for given E and confidence level.**