

Instructions: Exam 3 is going to contain a mix of free response questions, fill in the blank and multiple choice questions. It will be on **Wednesday, November 20th during class time**. You will be allowed to use a two page summary sheet(front and back) and your calculator. You will turn in the summary with the exam.

In preparation for the exam, you may wish to do the following:

- Review the concepts learned in each section and as you go, make your own one page summary. This will help you have all the things you need to remember in one place.
- Review the exercises used as examples during the lectures and problems from the homeworks.
- Go over this Study Guide and fill in any formulas and make sure all the concepts/formulas look familiar and you know when/how to use them.
- Finally, after you have studied, take the practice exam. This assignment is not required. It is there for you to use as practice after you have studied. Do not use the Practice as your only preparation for the Exam; use it as a study tool.

Exam 3 will cover Chapter 4 (only one section about permutations and combinations) and Chapters 5-9

Know definitions and formulas for the following concepts:

1. **Chapter 4**

- Formula and use of Permutations and Combinations

2. Chapter 5 Discrete Random Variables

- Know the difference between discrete and continuous random variables.
- Rules of probability distributions.
- Know the notation for mean(expected value), variance and standard deviation of a discrete random variable X .
- Know the four conditions that an experiment needs to satisfy to be a binomial experiment.
- What the notation $X \sim B(n, p)$ means.
- Know the formulas for binomial probabilities and when each one of them is used.
- Know the formulas and notation for the mean(expected value), variance and standard deviation.

3. Chapter 6 Continuous Random Variables

- Know Uniform Distributions (formulas and how to find probabilities, mean, st dev).

4. Chapter 7 Normal Distributions

- Normal distributions problems
- Know notation $X \sim N(\mu, \sigma)$
- Know how to find probabilities using calculator and inverse probability questions aka normalcdf and invNorm functions in calculator.

5. Chapter 8 Central Limit Theorem

- Know the result of the Central Limit Theorem and when to use it.
- $\bar{X} \sim N(\mu, \frac{\sigma}{\sqrt{n}})$
- Know the difference between $P(x > k)$ and $P(\bar{x} > k)$.

6. Chapter 9 Confidence Intervals

- Population Mean (μ)

Known σ :

$$CI = \bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

Calculator Command = *ZInterval*

$$\text{Finding } n = \left(\frac{Z_{\alpha/2} \cdot \sigma}{ME} \right)^2$$

Unknown σ :

$$CI = \bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$$

degrees of freedom: $df = n - 1$

Calculator Command = *TInterval*

$$\text{Finding } n = \left(\frac{t_{\alpha/2} \cdot s}{ME} \right)^2$$

- Population Proportion (p)

$$CI = \hat{p} \pm z_{\alpha/2} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

Calculator Command = *1 - PropZInterval*

$$\text{Finding } n = \hat{p}(1 - \hat{p}) \left(\frac{z_{\alpha/2}}{ME} \right)^2$$

Conditions:

$$n\hat{p} \geq 10$$

$$n(1 - \hat{p}) \geq 10$$