

## STATISTICS 7 – REVIEW FOR FINAL EXAM (MATERIAL AFTER MIDTERM 2)

### Know how to find, construct or calculate (example, page number(s) of example):

1. Describe a sampling distribution for one sample mean. (9.8, 333)
2. Describe a sampling distribution for the sample mean of paired differences (9.9, 337)
3. Describe a sampling distribution for the difference in two sample means (9.10, 339-340)
4. Calculate a standardized statistic for a given value of a sample mean or mean difference (9.12, 343)  
*For 1 to 3, see the summary table on page 353 (at the end of Chapter 9)*  
*Practice problems for 1 to 4 (answers in back of book): 9.65bd (for 1 and 4), 9.75 (for 2), 9.81ab (for 3)*
5. Find a confidence interval for a population mean (11.6, 415-416)
6. Find a confidence interval for a population mean of differences for paired data (11.10, 424)
7. Find a confidence interval for difference in two population means, independent samples (11.11, 427-428)  
Note: In this situation you would be provided with either the standard error or computer output.  
*For 5 to 7, see the summary table on page 439 (at the end of Chapter 11)*  
*Practice problems for 5 to 7 (answers in back of book): 11.33 (for 1), 11.49a (for 2), 11.53 (for 3)*
8. Carry out a hypothesis test for one population proportion (12.11, 465-467)
9. Carry out a hypothesis test for one population mean (13.1, 501 and 503-504)
10. Carry out a hypothesis test for a population mean of differences for paired data (13.2, 508-510)  
*For 8 to 10, see the summary table on page 534 (at the end of Chapter 13)*  
*Practice problems for 8 to 10 (answers in back of book): 12.51 (for 8), 13.25 (for 9), 13.39 (for 10)*

### Know how to identify:

1. Which of the 5 parameters is relevant in a given situation.
2. Whether it is more appropriate to use paired data or independent samples in a given situation.
3. Whether it is more appropriate to use a confidence interval, hypothesis test, or both in a given situation.
4. The null and alternative hypotheses in a given situation, including whether to use one or two-sided  $H_a$
5. What constitutes a type 1 error and type 2 error in a given situation, the consequences of each, and which is more serious in that situation.

### Understand:

1. What a sampling distribution is.
2. The purpose of statistical inference, including the relationship between a parameter and statistic; a population and a sample, and when statistical inference is not needed
3. Why and when a t-distribution is used in place of a z-distribution
4. How to interpret a confidence interval for a mean (and possible misinterpretation – see page 417)
5. The logic of hypothesis testing (see Lesson 2 on page 455)
6. How to interpret a p-value
7. How to use a p-value to make a conclusion
8. The possible conclusions that can be made for a hypothesis test, and why (i.e. why we don't accept  $H_0$ )
9. How a type 1 error or type 2 error is made and when each one could be made
10. The concept of the power of a test
11. The relationship between sample size, p-value, power and the outcome of a hypothesis test
12. Statistical significance versus practical importance
13. The relationship between confidence intervals and hypothesis tests
14. The problem of multiple testing
15. When results can be extended to a population
16. When a cause-effect conclusion can be made
17. Non-statistical factors that contribute to assessing cause and effect
18. The many ways statistics is used in life (Chapter 17).