Chapter 9 & 10 Review Sheet

1. Men versus Women. The National Assessment of Education Progress (NAEP) Young Adult Literacy Assessment Survey interviewed a random sample of 1917 people 21 to 25 years old. The sample contained 840 men, of whom 775 were fully employed. There were 1077 women, and 680 of them were fully employed.

a) Use a 99% confidence interval to describe the difference between the proportions of young men and young women who are fully employed. Don't forget to interpret the CI!

2. An automobile manufacturer tries two distinct assembly procedures. In a sample of 350 cars coming off the line using the first procedure there are 28 with major defects, while a sample of 500 autos from the second line shows 32 with defects. Is the difference significant at the 10% significance level?

b. \hat{p}_1

р

 $_{\mathsf{c.}} \hat{p}_2$

e. *p*-value

f. p_1

g. p_2

^{3.} Can you define what each of the following represents:

4. Researchers at the National Cancer Institute released the results of a study that examined the effect of weed-killing herbicides on house pets. Dogs were examined for the presence of malignant lymphoma. We want to estimate the difference between the proportion of exposed dogs that develop lymphoma and the proportion of unexposed dogs that develop lymphoma.

Group	Sample Size	# with Lymphoma		
Exposed	827	473		
Unexposed	130	19		

Find a 95% confidence interval for the difference between the proportion of exposed dogs that develop lymphoma and the proportion of unexposed dogs. What is your conclusion?

5. Identify if each of the following represents a "Two sample" or "Matched Pairs":

a) To test the wear characteristics of two tire brands, A and B, Brand A is mounted on 50 cars and Brand B on 50 other cars.

b) To test the wear characteristics of two tire brands, A and B, one Brand A tire is mounted on one side of each car in the rear, while a Brand B is mounted on the other side. Which side gets which brand is determined by flipping a coin. The same procedure is used on the front.

c) To test the effect of background music on productivity, factory workers are observed. For one month they had no background music. For another month they had background music.

d) A random sample or 10 workers in Plant A is to be compared with a random sample of 10 workers in Plant B in terms of productivity.

e) A new weight-reducing diet was tried on 10 women. The weight of each woman was measured before the diet and again after 10 weeks on the diet.

6. A researcher speculates that because of differences in diet, Japanese children may have a lower mean blood cholesterol level than U.S. children do. Suppose that the mean level for U.S. children is known to be 170. What hypotheses should the researcher test?

7. For which of the following P-values (there can be more than one correct answer) will the null hypothesis be rejected when performing a test with a significance level of 0.05:

a.	0.001	0.021	0.078	0.047	0.148
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- 8. A credit bureau analysis of undergraduate students' credit card records found that the average number of credit cards in an undergraduate's wallet was 4.09. It was also reported that in a random sample of 132 undergraduates, the sample mean number of credit cards that students said they carried was 2.6 and a sample standard deviation of 2.7.
 - i. Is there convincing evidence that the mean number of credit cards that undergraduates report carrying is less than the bureau's figure of 4.09?
 - ii. Interpret the P-value, in context.
- 9. A growing concern of employers is time spent in activities like surfing the Internet and emailing friends during work hours. The *San Luis Obispo Tribune* summarized the findings from a survey of a large sample of workers in an article in 2006. Suppose that the CEO of a large company wants to determine whether the average amount of wasted time during an 8-hour workday for employees of her company is less than the reported 120 minutes. Each person in a random sample of 10 employees was contacted and asked about daily wasted time at work.

108	112	117	130	111	131	113	113	105	128
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- i. Do these data provide evidence that the mean wasted time for this company is less than 120 minutes? Use lpha = 0.05.
- ii. Describe one source of bias for this study and its effect on the data.
- iii. Explain how the data could be collected as an observational study instead of a survey.
- 10. The mean systolic blood pressure for white males ages 35-44 in the US is 127.3w. The mean blood pressure for a random sample of 101 diabetic males ages 35-44 is 129 with a sample standard deviation of _____?___. We are interested in determining if the blood pressure for diabetic males differs from that all males in the specified age group.
 - i. Perform a significance test at the 0.01 level of significance of the hypothesis that the mean systolic blood pressure is 127.3.
 - ii. For the test you conducted in part a, describe a potential consequence if Type I error occurs.
 - iii. For the test you conducted in part a, describe a potential consequence if Type II error occurs.
 - iv. Name two ways to increase the *Power* of the test.
- 11. Two methods of computing body fat, UWW (*x*) and MRI (*y*) were compared and the following 20 differences (d = x y) were obtained: -2.8, 0.8, 1.0, 2.6, -1.4, -1.2, -2.4, 0.9, 3.1, 0, 1.7, 5.6, -1.5, 2.9, 3.6, -1.1, 5.8, -1.1, 6.3, 5.3. Carry out a significance test of the hypothesis that these methods give different results at the .05 level of significance.
- 12. Explain the conclusion that can be made if the true mean difference is a negative value in this scenario.