

FREC 408 Assignment 6

Issued: November 3, 2003

Due: End of day, November 17, 2003

Be sure to:

- Put your name and the Assignment # on the front
- Answer as completely as you can. All I can go on is what you give me, so show your work.
- Be as neat as possible. You can write it out, but please be neat.
- Staple or place in a folder

1. *Environmental Science and Technology* (Oct., 1993) reported a study of contaminated soil in the Netherlands. Seventy-two ($n = 72$) 400 gram soil specimens were sampled, dried, and analyzed for the contaminant cyanide. The cyanide concentration (in milligrams per kilogram - mg/kg - of soil) of each specimen was determined using an infrared microscope method. The sample resulted in the following data:

mean cyanide level of $\bar{x} = 84$ mg/kg
standard deviation of $s = 80$ mg/kg
 $n = 72$

- a. Test the hypothesis that the true mean cyanide level in the soil is less than 100 mg/kg. Use $\alpha = .10$
- b. Would you reach the same conclusion as part 1 using $\alpha = .05$? $\alpha = .01$? Why can the conclusion of a test change when the value of α is changed?
2. Answer Problem 8.31 on page 414 in Chapter 8 (cocaine use and birth weight) 15 pts
This is a small sample problem. **You must show your answer to get credit.**
3. Answer problem 8.92 on page 443 in Chapter 8 (cell phones and accidents) 15 pts
This is a proportion problem. The data file is on the web site.
4. The following is some data from two independent random samples 20 pts
I want you to enter it into Excel - use two columns, one for each variable. The data are also in an Excel file on the web page, called **diffmean.xls**

| Samp1 | Samp2 |
|-------|-------|
| 52 | 52 |
| 33 | 43 |
| 42 | 47 |
| 44 | 56 |
| 41 | 62 |
| 50 | 53 |
| 44 | 61 |
| 51 | 50 |
| 45 | 56 |
| 38 | 52 |
| 37 | 53 |
| 40 | 60 |
| 44 | 50 |
| 50 | 48 |
| 43 | 60 |
| | 55 |

Problem 4 continued

You will conduct a small sample difference of means test using Excel, using the following commands: Tools; Data Analysis, t-test, Two Sample Assuming Equal Variances

To do this problem it is best to state the larger mean as the Variable 1 - it results in a positive test statistic. The larger mean is Sample 2.

- a. Do the data provide sufficient evidence to conclude that $(\mu_1 - \mu_2) > 9$? **Note: in Excel you can specify the *Hypothesized Mean Difference* and you should indicate 9.** Conduct a formal test (show the null hypothesis, alternative and so forth) using $\alpha = .05$. Most of this information can be taken from Excel.
 - b. Did the assumption of using pooled variance seem reasonable (that is, were the variances of the two samples nearly equal)? How can you tell?
5. On the web site is the Health data we used earlier and in the Group 7 assignment. 30 pts
I want you to replicate the group assignment and conduct a difference in means test for Blood Pressure, between males and females.
- a. You will have to arrange the data.
 - Sort the data by gender;
 - Copy the Blood pressure data for males into a new column, and the data for females into another column.
 - I suggest you put the two columns of data into a new worksheet. Be sure to label each column as males and females so you can keep track.
 - b. Use Excel to get the descriptive Statistics for each group and briefly describe and compare Blood Pressure for each females versus males.
 - c. Use Excel to conduct the t-test difference of means **assuming unequal variances**. Take the results from this output and conduct a Hypothesis Test that the mean Blood Pressure are different between females and males. Use $\alpha = .01$ for your test. Show all the Hypothesis Test parts.