

**Purpose:** I. To use MINITAB to conduct large and small sample hypothesis tests for a population mean. II. To use MINITAB to produce a confidence interval and to perform a hypothesis test for comparing two population means.

**Reading:** Text; section 8.4 for large sample hypothesis tests, section 9.3 for small sample hypothesis tests, and chapter 10 for confidence intervals and hypothesis tests for comparing two population means.

**Turn in:** I. A print out of the session window for the large sample hypothesis test and a print out of the session window for the small sample hypothesis test. II. A print out of the session window for a confidence interval and hypothesis test for comparing two population means. Answers to the questions at the end of this assignment.

**Instructions:** What follow are the MINITAB commands for conducting large and small sample hypothesis tests for a population mean and the commands for producing confidence intervals and performing hypothesis tests for comparing two population means. Words in capital letters followed by the symbol > indicate a sequence of menu items to be selected/clicked.

I. A. Large Sample Hypothesis Test for a Population Mean.

Begin by accessing the data file "Grades". (This file is found in the SampleData subdirectory.)

FILE>OPEN WORKSHEET>GRADES>OPEN

Columns C1-C3 will each be loaded with 200 entries of data titled Verbal, Math, and GPA respectively.

Now perform a hypothesis test on the GPA data in C3 with the following conditions.

$$\alpha = .05$$

$$H_0 : \mu = 2.56$$

$$H_1 : \mu > 2.56$$

STAT>BASIC STATISTICS>1-SAMPLE Z, variables C3, test mean 2.56, alternative greater than, standard deviation .580 (this is the sample standard deviation), OK.

I. B. Small Sample Hypothesis Test for a Population Mean.

For this exercise, refer to problem 17 of chapter 9 (page 361). First clear the data in the columns by highlighting them and pressing delete or using the "Manip" icon and following the prompts. Then type into C1 the 23 observations.

Now perform a hypothesis test for the mean density of the earth (water has density  $1 \text{ g/mm}^3$ ) under the following conditions.

$$\alpha = .05$$

$$H_0 : \mu = 5.50$$

$$H_1 : \mu \neq 5.50$$

STAT>BASIC STATISTICS>1-SAMPLE T, variables C1, alternative not equal, OK.

Print the resulting session window.  
FILE>PRINT SESSION WINDOW, follow prompts.  
Delete the data in C1.

## II. Confidence Interval and Hypothesis Test for Comparing Two Population Means.

For this exercise, refer to problem 16 of chapter 10 (page 405).

Type the title “Female” in the box below C1 and enter the 8 corresponding observations in the C1 column. Type the title “Male” in the box below C2 and enter the 11 corresponding observations in the C2 column.

Use the following commands to obtain a 95% confidence interval for the difference of population mean weights (female – male) and perform a hypothesis test with the conditions  $\alpha = .05$ ,  $H_0 : \mu_f = \mu_m$ ,  $H_1 : \mu_f \neq \mu_m$ .

STAT>BASIC STATISTICS>2-SAMPLE T, click “samples in different columns”, type Female and Male for the first and second columns, OK.

The session window will display the confidence interval as well as the hypothesis test information. Print the session window after deleting any superfluous information. Make sure you have entered your name at the top of the session window. FILE>PRINT SESSION WINDOW, and follow prompts.

**Questions:** Answer precisely and concisely the following.

1. For part I A, state the P-value and the conclusion from the hypothesis test (*i.e.* whether the null hypothesis is accepted or rejected). Would the conclusion have been the same for  $\alpha = .1$ ? For  $\alpha = .01$ ?
2. For part I B, state the P-value and the conclusion from the hypothesis test. The actual mean density of the earth is  $5.5 \text{ g/cm}^3$ , were Cavendish’s observations consistent with this value (assuming the numbers in the text are in the same units)?
3. For part II, write the 95% confidence interval, the P-value, and state the conclusion from the hypothesis test.