Math 160/263 – Assignment #5
Title: Hypothesis Testing
Worksheet: data5084.MTW; data5084a.MTW

The purpose of this assignment is to carry out Hypothesis Testing using Minitab. This assignment uses material in Chapters 14 and 16 of the Minitab Manual.

The Z Statistic Hypothesis Test for Proportions

Records for the 2005-2006, 2006-2007, 2007-2008 and 2008-2009 seasons for the U of A men's basketball team are in data5084.MTW. (Source: University of Arizona Athletics Home Page). We wish to test whether or not there is a "Home-court Advantage."

1. Using **Stat** ⇒ **Tables** ⇒ **Tally Individual Variables** compute the overall percentage of games Arizona has won. Select "Counts" and "Percents" for the column "W/L."

2. Now determine if Arizona has a better record at home than away. Use **Data** ⇒ **Unstack Columns** to "Unstack the data in" "W/L" into two new columns, "Using subscripts in" "Home or Away." Put the unstacked data "after last column in use" in your worksheet. Use **Stat** ⇒ **Tables** ⇒ **Tally Individual Variables** to display the "Counts" and "Percents"of home games and away games won.

3. State the null and alternate hypotheses for a test to determine if Arizona has a greater proportion of wins at home than away.

4.Use the **Stat** ⇒ **Basic Statistics** ⇒ **2 Proportions** dialog Box and enter the summarized data to perform a z-test for the equality of two proportions. Select "Samples in different columns." The data for "First" will be the W/L for home games, for "Second" will be the W/L for away games. In the "2-Proportion Options" dialog box, enter the following:

a. 95.0 in the "Set Confidence Level" window

b. 0.0 in the "Test difference" window

c. Select "Greater than" in the drop-down "Alternative" window.

Put the results in the ReportPad.

5. What is the p-value, and what do you conclude from the test about the difference in proportions?

6. Interpret the result of the test in terms that can be understood by someone who knows no statistics.

The T Statistic Hypothesis Test

7. Another measure of the "Home-court Advantage" is the winning margin, for games Arizona has won. Is this margin different between home and away games? Records for games Arizona has won are in data5084a.MTW. Included are columns for the differences in scores for home games and away games. State the null and alternate hypothesis for a test to determine if the data supports a home advantage in winning margin.

8. Use **Stat** $\Rightarrow$ **Basic Statistics** $\Rightarrow$ **2-Sample T** to test if the mean of Arizona's margin of victory at home is significantly greater than Arizona's margin of victory away. Select "Samples in different columns." The "First" is the column for home games, the "Second" is the column for away games. In the "2-Sample t Test and Confidence Interval" dialog box, select "Options" and enter the following:

a. 95.0 in the "Confidence Level" window

b. 0.0 in the "Test difference" window

c. Select "Greater than" in the drop-down "Alternative" window.

Return to the "2-Sample t Test and Confidence Interval" dialog box, select "Graphs" and select "Boxplots of data."

9. What is the p-value and what do you conclude from this test concerning H_0 and H_a?

10. Interpret the result of the test in terms that can be understood by someone who knows no statistics.

11. Save, edit, and print out your report for submission to your instructor. Ensure you include the boxplots from #8.