

Math 263: Excel Assignment 7 on Hypothesis Tests (Version 2)

You must do the computer work for this assignment yourself, although you may certainly talk to other people. Answers which appear to be copied will be treated as an integrity violation.

Note: You do not need to hand in your Excel sheet with the answers to your questions.

There is a popular belief in basketball that when a team plays a home game, they have a better chance of winning, or at least will play better than they would have done on the road. To test the belief that there is a “Home Court Advantage”, we will analyze the UA team’s scores.

The file *UA-BballResults11.xlsx* has all the UA conference basketball scores from 2001-2011. There are 10 teams in the Pac-10 conference,¹ and each team plays each other twice that season, once at home and once away. Thus there are 18 games per year and 198 games in the eleven-year period, with equal numbers of home games and away games.

Sorting the Data

Before making the comparisons, you should sort the data into two groups, one with all the home games and one with all the away games. One way of doing this is to:

- Copy all the information on a new sheet
- Erase the dates (2001, 2002, etc)
- Sort the data based on the home/away (column D), so all the away games are on top and the home games are on the bottom.
- Cut and paste the home games to another part of the spreadsheet.

Another way is to select the top row and input “Filter” tabs from the “Data” menu. By pulling down the tabs, filter the Away games and the Home games and copy and paste to another sheet. (The “Filter” tabs are often very useful and take only a minute to insert!)

There should be the same the same number of games in each group, “Home” and “Away”.

Calculating Wins and Losses

For each group of games, make two new columns:

- One column showing the difference in scores for each game: Difference = Arizona – Opponent.
- The other column showing if Arizona won. Here you can use the “IF” command. You want to test that the difference in scores is positive, so you can use = IF(Difference > 0, 1, 0). This puts a 1 in the row if Arizona won and a 0 if Arizona lost or tied. “Difference” refers to the cell where the difference for that match is stored.

Calculating P-values

For the Normal Distribution: A one sided test:

= NORMDIST(z, 0, 1, TRUE) if z is negative, or

= 1 – NORMDIST(z, 0, 1, TRUE) if z is positive.

¹In 2012, or later, Utah and Colorado at Boulder will join the conference.

For the T-Distribution: The t -value must be positive, so use $ABS(t)$.

One sided test: = TDIST($ABS(t)$, df , 1) or

Two sided test = TDIST($ABS(t)$, df , 2)

Questions:

- 1. Decide if UA wins more often at home.** To do this, test whether the proportion of UA wins at home is significantly greater than the proportion of UA wins away. Write out your reasoning in detail, showing
 - the null and alternate hypotheses,
 - the calculation of the standard error,
 - the calculation of the test statistic,
 - the p -value,
 - the interpretation of the p -value,
 - your conclusion and its interpretation in terms of UA basketball.
- 2. Decide if the margin of victory is greater at home or away over all games.** To do this, you will look at the margin of victory, or difference in scores, for all games (including those that UA won and those that UA lost). Some of the margins will be negative, where UA lost the game. Test whether UA's margin of victory at home is significantly greater than UA's margin of victory away. Write out your reasoning in detail, showing
 - the null and alternate hypotheses,
 - the calculation of the test statistic,
 - the p -value,
 - the interpretation of the p -value
 - your conclusion and its interpretation in terms of UA basketball.
- 3. OPTIONAL. (Not for extra points; just if you are interested.) Decide if the margin of victory is greater at home or away using only the games in which UA won.** To do this, you will look at the margin of victory, or difference in scores, for only the games that UA won. Test whether UA's margin of victory at home is significantly greater than UA's margin of victory away. Write out your reasoning in detail, showing
 - the null and alternate hypotheses,
 - the calculation of the test statistic,
 - the p -value,
 - the interpretation of the p -value
 - your conclusion and its interpretation in terms of UA basketball