Application exercise 5.3:
Chi-square testing

Submit your responses on Sakai, under the appropriate assignment. Only one submission per team is required. One team will be randomly selected and their responses will be discussed.

Basketball and presidential vote in NC

Public Policy Polling surveyed 849 registered North Carolina voters from February 24th to 26th, 2015. The full report on the poll results can be found at http://www.publicpolicypolling.com/pdf/2015/PPP_Release_NC_30515.pdf. We are going to focus on responses to the following questions:

• Who will you be rooting for in the Duke-UNC basketball game next month? (Remember this survey was before the Duke-UNC game)

• In the last presidential election, did you vote for Barack Obama or Mitt Romney?

Part 1:

1. First let's take a look at the following table of vote distribution from the report linked above:

q15 In the last presidential election, did you vote for Barack Obama or Mitt Romney?

Barack Obama	45%
Mitt Romney	48%
Someone else / Don't remember	7%

According to these results, how many people in the sample voted for Obama, how many for Romney, and how many for others or don't remember?

2. We want to evaluate if NC vote distribution is different than the national outcome (51% Obama, 47% Romney, 2% Other). What test would be appropriate?

3. Calculate the expected counts under the assumption of the null hypothesis of this test being true.

[For the sake of time we'll not complete the test in class, but it's strongly recommended that you complete it on your own.]

Part 2:

4. The following table is also from the report linked above.

	Base	2012 Vote Barack Obama	Mitt Romney	Someone else / Don't remember
Duke/UNC Basketball Support				
Duke	27%	23%	31%	27%
UNC	41%	46%	38%	23%
Not sure	32%	31%	31%	50%

Fill in the contingency table of **counts** below based on these tables. Note that the rest of your responses depend on accurately falling in this table. Please ask questions if you are not sure / get stuck. Hint: You'll need to use

	Barack Obama	Mitt Romney	Other / Don't remember	Total
Duke	*			
UNC				
Not sure				
Total				849

5. We want to evaluate whether college basketball allegiance of NC residents is associated with how they voted in the 2012 presidential election. What type of test is most appropriate? Explain your reasoning.

6. What are the hypotheses?

7. Calculate the **expected** number of those who voted for Barack Obama who support Duke.

8. Assuming that all other expected counts are high enough, check if the conditions for inference are met.

9. Calculate the contribution of the "Duke and voted for Barack Obama" cell (the one with the asterisk in the table above) to the test statistic.

10. The test statistic is given as 17.7161. Calculate the p-value.

11. What is the conclusion of the hypothesis test?

This analysis completed in R can be found at https://stat.duke.edu/courses/Spring15/sta101.001/app/basket_pres.html.