

Math 445  
Midterm Exam – Part II (Take home)  
**Due Wednesday, May 11, 2014 by 1:50 pm**

**Instructions:**

- This exam is open book, open notes, open assignments. You are not allowed to discuss this exam with any other living individual besides me.
- I reserve the right to not answer some questions (this is an exam after all).
- Your report must be typed and should be written in standard english, free of grammatical errors.
- You should reaffirm the Honor Code on your report.
- You should choose a (continuous) 48 hour time block to take the exam. Submit your exam upon the completion of this 48 hour time block (if I am not in my office, then slide your exam under my door). All exams are due by Wednesday, May 11, 2014 at 1:50 pm. A late penalty will be assessed as necessary.

**Exam:**

In August of 2012, news outlets ranging from the *Washington Post* to the *Huffington Post* ran a story about the rise of atheism in America. The source for the story was a WIN-Gallup International poll that asked people, “Irrespective of whether you attend a place of worship or not, would you say you are a religious person, not a religious person or a convinced atheist?” The question of atheism was asked by WIN-Gallup International in a similar survey that was conducted in 2005. The press release for the 2012 poll can be viewed by the following link:

[http://www.wingia.com/web/files/richeditor/filemanager/Global\\_INDEX\\_of\\_Religiosity\\_and\\_Atheism\\_PR\\_6.pdf](http://www.wingia.com/web/files/richeditor/filemanager/Global_INDEX_of_Religiosity_and_Atheism_PR_6.pdf)

The 2012 data are presented on pages 15 and 16 of the above report; however, they are not in tidy format. A tidy version of this data set can be found on the course webpage (atheism.csv). Also note that Table 4 on page 13 of the report summarizes survey results from 2005 and 2012 for 39 countries.

Imagine that you are a data journalist and were asked to investigate atheism in the United States using this survey. To do this you must analyze the data and write a short report summarizing your findings. Specifically, you must

- provide an estimate of atheism (in terms of a proportion) in the United States in 2012.
- determine whether there is convincing evidence that the United States has seen a change in its atheism index between 2005 and 2012.
- provide an estimate of the change, if it is significant.

Your report should include a couple sentences describing your analysis and address each of the above points, using appropriate statistical summaries. Your editor is a busy person so they only want to see your final results. If you analyze the data many ways to address each question, present only the one that you believe is the most appropriate.

In addition to the report for your editor, write a short overview of the methods that you used. In this overview, be sure to justify any assumptions that you need to make in order to perform your analysis. You should submit any R commands and output used in your final analysis as part of this overview.