Homework #8 Due Tuesday October 25, 2011 Econ 29000 Kevin R Foster, CCNY

For this exercise your study group may hand in a single assignment. When submitting assignments, **please include your name and the assignment number as part of the filename**. Please write the names of your study group members at the beginning of your homework. These assignments may be made public and available to all members of the class.

Please complete Exam 1 – convince yourself that, given more time and less stress, you could do all of the questions. Although the study group can hand in a single assignment, I *strongly* suggest that each individual should make sure that they can do each question! You'll see questions like these again.

- 1. You might find it useful to sketch the distribution.
  - a. For a Standard Normal distribution what is area to the right of 0.2?
  - b. For a Standard Normal distribution what is area to the right of 0.9?
  - c. For a Standard Normal distribution what is area to the right of 2.0?
  - d. For a Standard Normal distribution what is area to the left of 0.5?
  - e. For a Standard Normal distribution what is area to the left of -1.6?
  - f. For a Standard Normal distribution what is area in both tails farther from the mean than -2.2?
  - g. For a Standard Normal distribution what is area in both tails farther from the mean than 1.1?
  - h. For a Standard Normal distribution what is area in both tails farther from the mean than 0.8?
  - i. For a Standard Normal distribution what is area closer to the mean than 2.4?
  - j. For a Standard Normal distribution what values leaves probability 0.778 in both tails?
  - k. For a Standard Normal distribution what values leaves probability 0.281 in both tails?
- 2. You might find it useful to sketch the distribution.
  - a. For a Normal Distribution with mean 12 and standard deviation 1.2, what is area to the right of 14.9?
  - b. For a Normal Distribution with mean -5 and standard deviation 1.8, what is area to the left of -7.7?
  - c. For a Normal Distribution with mean -5 and standard deviation 3.0, what is area to the left of -11.6?
  - d. For a Normal Distribution with mean 4 and standard deviation 0.9, what is area in both tails farther from the mean than 2.1?

- e. For a Normal Distribution with mean 7 and standard deviation 7.1, what is area in both tails farther from the mean than 16.9?
- f. For a Normal Distribution with mean 3 and standard deviation 3.4, what values leaves probability 0.05 in both tails?
- g. For a Normal Distribution with mean 8 and standard deviation 8.7, what values leaves probability 0.351 in both tails?
- h. For a Normal Distribution with mean -11 and standard deviation 0.2, what values leaves probability 0.291 in both tails?
- 3. Bloomberg News reported on a US audit of mortgages, showing that the average number of "seriously delinquent" loans originated by Countrywide (now owned by Bank of America) was 6.76%, versus a general average of 3.59% made by all other originators. There were 4050 loans made by Countrywide. (H. Son, D. Kopecki, D. Griffin, Oct. 5, 2011, "BofA May Face Fraud Claims for Soured Loans," Bloomberg News.)
  - Test the null hypothesis that Countrywide's delinquent loan rate was actually not different from 3.59%; how likely is it that Countrywide was just unlucky? (What is the p-value?)
  - b. Create a 95% confidence interval for Countrywide's delinquency rate. What is the 90% confidence interval? The 99% interval?
  - c. What reasons, other than fraud, could explain why Countrywide's loans might have a higher delinquency rate?
- 4. Using the PUMS data (available from Blackboard) on people in New York City, consider educational attainment.
  - a. What fraction of people 25-55 have a college degree (associate, bachelor, or advanced)?
  - b. Sampling people aged 25-55, what is the probability of finding someone with some college degree? With a bachelor or higher degree?
  - c. What is the conditional probability that a person, age 25-55 and having some college degree, has a family income below the poverty line? Below 150% of the poverty line?
  - d. Form a hypothesis test for whether the chance of being in poverty (under 100% of poverty line) is independent of degree. What is the p-value? What is a 95% confidence interval for the difference?
  - e. Why do you think that we would find these results? Explain (perhaps with some further empirical results from the same data set).