Discussion Section #2
Due: To be submitted to CatCourses by 11:59pm.

Instructions:

This week you will use R to study the classical probability problem of sampling without replacement from an urn.

You will receive some basic guidance in R from your TAs and a piece of code that you will only need to slightly modify. You are welcome to work alone or in small groups but everyone is responsible for turning in their own code/assignment.

This week, you are responsible for submitting:

- Your modified R script.
- A written report as a PDF which shows the plots you have created in R and answers the questions below.

  Note: If you can not submit as a PDF you should get permission for a different file format from your TA.

Simply providing the correct answer, without justification, is not considered complete. For credit you **must** either show you steps (if it's a calculation problem) or explain/justify your reasoning (if it's a short answer problem).

Assignment:

This Lab considers the following scenario:

You have an urn with a total of 7 balls: 3 black balls and 4 red balls. You will draw 3 balls from this urn **without replacement**. Estimate the probability of drawing 0,1, 2 or 3 black balls and compare this estimate to the true probabilities.

1. Calculate the true probabilities in this scenario. (This will be in your written report. The code you received provides a lot of reasoning in the comments.)
2. Either modify the code you were given (or if you like create your own) to simulate this scenario. (This code will be submitted as an R script.)
3. Provide output from your code (the figures comparing both probabilities) for **at least** these two different scenarios:
   (a) `numTrials` = 10^2
   (b) `numTrials` = 10^4
4. **A short explanation** of what is shown in your graphs and what you have learned from this exercise. (Example: Do you feel you agree well with the theoretical results? Which one is better? How many trials do you think you need to get a "good" agreement to the true probability?)
5. **Extra Credit (1 Point)**: (There is no single right answer to this next question!) If you did not know the true probabilities for this experiment how would you decide your simulations had considered *enough* trials.