Assignment #1 (I1)
Basic Probability
Individual Assignment

1. Assume that the length of a typical televised baseball game including all the commercial timeouts follows a Normal distribution with a mean of 2.5 hours and a standard deviation of 0.37 hours. Now consider a televised baseball game that begins at 2 p.m.

a. If the next regularly scheduled broadcast program is at 5.00 p.m., what is the probability that the baseball game will cut into that program?

b. If the game is over before 4.30 p.m., another half-hour show can be inserted between 4.30 and 5.00 p.m. What is the probability of this occurring?

c. If the game is over before 4.00 p.m., an hour-long show can be inserted between 4.00 and 5.00 p.m. What is the probability of this occurring?

d. Can you provide a cut-off time by which you can be 99% sure that the baseball game would end?

e. Can you provide lower and upper cut-offs times such that the probability of the game ending between these times is 95%? Assign same probabilities on both ends when calculating the cutoffs (i.e., 2.5% on the right side and 2.5% on the left side).

2. Corporate governance mechanisms are organizational practices aimed at ensuring that publicly traded firms act in the interest of their shareholders. One such practice is having an independent financial expert (IFE) serve on the firm's board. The following table shows the joint probability distribution between whether a firm has an IFE on its board (X) and whether it has had to restate its earnings (Y), a sign of serious accounting irregularities.

	Did Not Restate Earnings (Y=0)	Restated Earnings (Y=1)	Total
No IFE on board (X=0)	0.58	0.12	
IFE on board (X=1)	0.27	0.03	
Total			1.00

a. Fill in the missing values in the table (the row and column corresponding to "Total").

b. What type of random variables are X and Y? (That is, discrete? or continuous?) What are their distributions? (That is, Normal? or Bernoulli? or Uniform?)

c. Compute E(Y). What does this number mean (in words)?

d. Compute E(X). What does this number mean (in words)?

e. Compute E(Y|X=0) and E(Y|X=1). What do these numbers mean (in words)? What (if anything) does this tell you about having IFEs on corporate boards?

f. A randomly selected firm (from this population) has had to restate its earnings. What is the probability that it has an IFE on its board? How would your answer have differed if you did not know whether or not it had to restate its earnings?

g. Are X and Y independent? Explain.

Assignment Submission: Submit your completed assignment as a PDF document (named YOURLASTNAME_I1.pdf) in the assignment submission link on blackboard.

Solution Format:

(1) You may type a word document with your answers and formulas used. Then save this document as a pdf file and submit.
(2) Or, you can code in R and use "commenting" to write your answers. The R script will then show both your formulas and answers. You can simply print this R script as a pdf file (Go to File => Print => save as pdf file)
(3) Or, you can use Excel and "type" your formulas as "texts". This way when you "save as" a pdf file, all your answers and formulas used will show up in the pdf file as "texts". When saving as a pdf file, you may need to change the print area (Page Layout => Page Setup => Print Area => Set Print Area) or adjust the scale (Page Layout => Scale to Fit => Scale).
(4) A picture of hand-written notes will not be accepted. Graders find reading students' handwritten notes difficult.

Grading:

If you only provide your final answer, and if the final answer is wrong, we cannot give you any credits. But if you show your working process in detail, we will be able to follow your thinking process and will try to take that into account (even when your final answer is not correct). So please show full calculation steps.

Others:

You may use R, Excel, or the Normal CDF table for this assignment. The numbers you get from a Normal CDF table may differ slightly from the numbers you get in Excel/R. This difference is due to the rounding error in the Normal CDF table. Grading TAs know this, and you don't have to worry.