Name:

1) Suppose the Red Sox and Yankees play a best-of-three series. That is, the two teams play until one or the other wins two games, at which point the series ends. Assume that the probability that the Red Sox win a particular game is always 0.55. (Hint: draw a tree diagram)

a) Find the probability that the series lasts for three games.

b) Find the probability that the Red Sox win the series, regardless of the number of games.

c) Find the probability that the series goes to three games, given that the Red Sox win.

d) Find the probability that the Red Sox win given that the series ends in two games.

2) Transactions arrive at a server at an average rate of 20 per minute. Each transaction consumes 0.5 seconds of CPU time, so the proportion of time that the CPU is busy is $U = Y/120$, where Y is the number of transactions that arrive that minute. a) Find the variance of the number of transactions Y that arrive in a given minute.

b) Find the expected value of U, the proportion of time that the CPU is busy. (You can use a spreadsheet to compute this numerically)

c) Find the variance of U. (You can use a spreadsheet to compute this numerically)

3) Blood banks classify blood by the presence or absence of two antigens, A and B, and an Rh factor (positive or negative).

Possible types are:

Type	A	B	Rh
A Positive	X		X
A Negative	X		
B Positive		X	X
B Negative		X	
AB Positive	X	X	X
AB Negative	X	X	
O Positive			X
O Negative			

Suppose 835 pints of blood have the following characteristics:

- 315 are type O
- 380 are type A
- 100 are type B
- 40 are type AB
- 34 are type AB and Rh positive
- 300 are type A and Rh positive
- 90 are type B and Rh positive
- 674 are Rh positive

Draw a Venn diagram with three circles (A, B, and Rh), and fill in the diagram to show the number of pints in each subdivision.