Homework 1

BSTA 550

Directions

Please turn in this homework on Sakai. Please submit your homework in pdf format. You can type your work on your computer or submit a single file with photos of your written work or any other method that can be turned into a pdf. The Adobe Scan phone app is an easy way to scan photos and compile into a PDF. Please let me know if you greatly prefer to submit a physical copy. We can work out another way for you to turn in homework.

Try to complete all of the problems listed below at some point this quarter! You may want to save some of them for studying later! Only turn in the ones listed in the "Turn In" column. Please submit problems in the order they are listed.

You must show all of your work to receive credit.

Chapter	Turn In	Extra Problems
1		# 3, 7, 9, 11
2	NTB # 1, 30	# 1, 4, 8, 16, 19, 23, NTB # 2
22*	TB # 1	# 3, 5, 7, 25, 27, 30, 31, 39-41, 43-48

* Please note the following for Chapter 22:

- See the table on pg. 277, which summarizes some key combinatorics concepts.
- Problems 39-48 are a set that build on one another and more advanced than the other problems. It'll be much easier to do #42 after doing 39-41.
- I *highly* recommend reading Chapter 23, which is a series of case studies in counting: poker hands and Yahtzee.

Non-textbook problems (NTB)

1. Suppose the following are the percentage of US adults with the following conditions:

   - A: Hypertension 33%
   - B: Diabetes 9%
   - C: Metabolic syndrome 24%
   - A or B: 39%
   - A or C: 45%
   - B or C: 28%
   - A or B or C: 48%

   a. Make a Venn diagram of the 3 conditions labeling the percentage (or probability) for *ALL* of the 8 "sections". *Hint: Start from the last condition and work your way up!*

   b. For each of the following (1. - 7. below), (*i*) write out the event using unions, intersections, and/or complements of the events A, B, and C (this is NOT finding the probability, that's in *ii*); (*ii*) find the probability of the event; and (*iii*) write a sentence explaining what the probability is of in terms of the context of the problem.

      1. $\mathbb{P}$(event at least one of the 3)
      2. $\mathbb{P}$(event none)
      3. $\mathbb{P}$(event A only)
      4. $\mathbb{P}$(event exactly one)
      5. $\mathbb{P}$(event A and B)
      6. $\mathbb{P}$(event A and B but not C)
      7. $\mathbb{P}$(event all 3)

Extra problem

2. Judith has a penny, nickel, dime, and quarter in her pocket. So does Joe. They both reach into their pockets and choose a coin (all four coins are equally likely to be selected). Let X be the larger value (in cents) of the coins selected by Judith and Joe. For reference, the penny is 1 cent, nickel is 5 cents, dime is 10 cents, and quarter is 25 cents.

   a. How many possible combinations is there for the pair of Judith's and Joe's selected coins? (Hint: we know to whom each coin belongs)

   b. Define the sample space for X in this experiment.

   c. Find the probability for each possible value of X.

d. Find the probability of the event that Judith's coin is worth more than Joe's.