Math 447 - Fall 2023 - Homework 02

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Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete by this date.

WMS (Wackerly, et al. Textbook):
ch.2.1 - 2.4

MF447 lecture notes:
ch.1 - 3.4

Other:
Nothing assigned yet

New reading assignments:

> It is really important for the WMS reading assignments that you work through the examples!

Reading assignment 1 - due Tuesday, September 5:

- **a.** Carefully read WMS ch.1. I will talk about this material in bits and pieces when relating the use of probability models to statistics issues of importance.
- **b.** Carefully read WMS ch.2.5.
- **c.** EXTRA CAREFULLY read WMS ch.2.6. In particular, study the examples and try to solve them closed book. The combinatorial analysis in this chapter only lists very few theorems which are easy to remember. What needs lots of practice is recognizing from a given problem how it fits to one of those theorems.

Reading assignment 2 - due: Wednesday, September 6:

- **a.** Carefully read WMS ch.2.7 and 2.8.

Reading assignment 3 - due Friday, September 8:

- **a.** Carefully read the remainder of WMS ch.2.

Written assignments are on the next page.

General note on written assignments: Some may be WebAssign assignments for grading and some may just be for practice. That is different for each homework set.

Written assignments - Not collected for grading:

- **a.** WMS ch.2.5 exercises: #2.27, 2.29, 2.33
- **b.** WMS ch.2.6 exercises: #2.35, 2.37, 2.43, 2.45, 2.55, 2.61, 2.68
- **c.** WMS ch.2.7 exercises: #2.71, 2.75, 2.79
- **d.** WMS ch.2.8 exercises: #2.95, 2.101, 2.107
- **d.** WMS ch.2.9-2.11 exercises: Pick your own.

MF note to #2.45: The solutions manual lists $\binom{17}{2,7,10} = 408,408$ as answer. I did not check whether $408,408$ is correct, but the multinomial coefficient is not: It should be $\binom{17}{2,5,10}$.

MF note to #2.79: Is it possible that A, B disjoint, $P(A) > 0, P(B) < 1$, and independence?

The solutions manual says NO, but the answer is YES: If $P(B) = 0$, then $0 \leq P(A \cap B) \leq P(B) = 0 \Rightarrow P(A \cap B) = 0$; and $P(A) \cdot P(B) = P(A) \cdot 0 = 0$.

MF note to #2.107: Possible solution (from the solutions manual): Consider flipping two fair coins.

- $A :=$ at least one tail. Then $P(A) = 3/4$.
- $B :=$ either 2 tails or 2 heads. Then $P(B) = 1/2$, thus $P(A) > P(B)$
- $C :=$ 2 tails. Then $A \cap C = \emptyset$, thus $P(A \cap C) = 0 \Rightarrow P(A \mid C) = 0$.
  Further, $B \cap C =$ 2 tails, thus $P(B \cap C) > 0 \Rightarrow P(B \mid C) > 0$ ■