MA162: Finite mathematics

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Schedule:

- Web Assign assignment (Chapter 7.3) due on Friday, November 15 by 6:00 pm.
- Web Assign assignment (Chapter 7.4) due on Tuesday, November 19 by 6:00 pm.
- Exam 3 on Monday, November 25, 5:00 pm to 7:00 pm.

Today is Chapter 7.4. We will see how some of the techniques from Chapter 6 can be applied to probability problems.

7.4: Counting Techniques in Probability Theory

- To find the probability of an event E, we can count the number of simple events in E, $n(E)$
- then count the number of simple events in the sample space, $n(S)$
- then divide:

$$P(E) = \frac{n(E)}{n(S)}$$

- Computing $n(E)$ and $n(S)$ may require techniques from Chapter 6.

7.4: Counting Cards

- A 5 card hand is drawn from a standard deck of 52 cards.
- Determine the probability of drawing a "4 of a kind"

- Begin by counting the total number of possible hands

- Then count the number of ways to get "4 of a kind."

7.4: Multiple Guess

- An MA 123 exam consists of 20 questions, multiple choice
- There are 5 choices for each question
- A student randomly guesses on all of the questions.
- What is probability student gets exactly 5 of the questions correct?

- What is the probability this student gets at least an 80% on the exam?

7.4: Urns

- A bag contains 5 white balls, 12 red balls, and 9 green balls.
- You reach in and draw out 5 balls.
- What is the probability that 3 of the balls are red and 2 are green?

7.4: Discrimination?

- 150 candidates apply for a job at a university
- The hiring committee reads the applications and brings in 2 candidates for on campus interviews
- By chance, both finalists are male
- Is this discriminatory?

7.4: Discrimination?

Need more info.

- Suppose that half of the candidates are males and half are females. What is probability that both finalists are male?

- What if 41 of the applicants are female and the other 109 are female. What is probability that both finalists are male?

7.4: Peanutless Peanut M&Ms

- Jason eats lots of peanut M&Ms.
- He notices that one out of every 200 peanut M&Ms is missing the peanut.
- Jason grabs a handful of 40 M&Ms out of a bowl of 1000. What is the probability at exactly one of these M&Ms is missing the peanut?

- What is the probability at least two of these M&Ms are missing their peanuts?

7.4: Maybe Tonight?

- A dish contains candy hearts, one out of eight of the hearts has the logo "Maybe Tonight?"
- George Michael keeps picking pieces of candy at random from a bowl of 200 until he picks a "Maybe Tonight?" piece. He stops once he picks such a piece.
- What is the probability that he picks his first "Maybe Tonight?" piece on his 4th pick?

7.4: What's Broke?

- A math professor using a computer system to print barcodes on exam papers, and, after students take the exam, the exam papers are scanned and graded from a computer screen.
- 840 pages are printed in "version A" (120 exams, 7 pages each)
- 840 pages are printed in "version B" (120 exams, 7 pages each)
- The duplication company printed the different versions on different printers.
- The exams are shuffled before they are given to students.
- By the time the exams are scanned, the "version A"s and "version B"s are well mixed.

7.4: What's Broke?

- The computer was unable to read the barcodes on 100 pages, these had to be corrected manually.
- It just so happened that every misread barcode was from the "version A."
- The math professor thinks there is a problem with one of the duplication company's printers.
- The duplication company claims that their printers are fine, the problem is with the math department's scanner.
- Who is right?