6/06/20

Agenda for Math 5710 ♬ Meeting #13 ☻☺ 7/09/20 (8:00 a.m. – 9:10 a.m.)

1. Hello:

Brigham City:	Adam Blakeslee	Ryan Johnson	Tyson Mortensen	
Logan:	David Allen	Natalie Anderson	Kameron Baird	Stephen Brezinski
	Zachary Ellis	Adam Flanders	Brock Francom	Xiang Gao
	Ryan Goodman	Janette Goodridge	Hadley Hamar	Phillip Leifer
	Brittney Miller	Jonathan Mousley	Erika Mueller	Shelby Simpson
	Steven Summers	Matthew White	Zhang Xiaomeng	

2. Note the syllabus' activity list for today:

13: H/7/09	1. Construct the concept of a combination, focus on methods of counting, comprehend associated structures, and discover and prove a theorem with respect the combinations. 2. Take advantage of Quiz 13.

3. Briefly, raise and address issues and questions stimulated by the following homework assignment:

   A. Study our notes from Meeting #12.

   B. Comprehend Jim's sample response to Quiz 12.

   C*. Solve Lunar's problem and display your computation (As usual upload the resulting pdf document on the appropriate *Canvas* Assignment link):

   The Osceola jail contains a row of 10 cells. Each of 10 inmates is randomly assigned to exactly one of those side-by-side cells. None of the 10 prisoners are exhibiting symptoms of the COVID-19 disease. However, unbeknownst to the correction officers who manage the jail, 5 of the 10 prisoners are carriers of the COVID-19 virus. Lunar would like to determine the probability of the event that no uninfected person occupies a cell next to an uninfected person.

   E. From the Video Page of *Canvas*, view with comprehension the video "permutations."

   F. Comprehend Jim's sample responses to the homework prompts that are posted on *Canvas*.

4. Walk through Glossary entries #034E–G and pretend we've proven Theorem 7 which we plan on doing soon:

   E. Definition of a *combination* on a finite set:

   Given $A \in \{$ finite sets $\} \wedge\ n, r \in \omega\ \wedge r \leq n \wedge |A| = n,$
   $((\text{ A combination of } r \text{ on } A) = B \Leftrightarrow\ B \subseteq A \ni |B| = r)$

   F. Note: Given $n, r \in \omega \ni r \leq n$, "${}_nC_r$" or "$\binom{n}{r}$" is read "the number of all possible combinations of n elements taken r at a time.

   G. Theorem 07: $${}_nC_r = \frac{n!}{r!(n-r)!}$$

5. Before Billy Lyons was murdered by Stag Lee Shelton (reference the lyrics to the song *Stagger Lee*), Billy wanted to compute the probability that a full house is drawn from a well-shuffled poker deck consisting of a standard poker deck (no jokers). Keeping in mind that a full house is five cards consisting of exactly three cards that are of the same domination (e.g., queen of diamonds, queen of spades, and queen of clubs) and the other two cards have the same denomination (e.g., six of clubs and six of hearts). In memory of Bill, let's solve this problem.

6. Ask ourselves why the following proposition is true; muse about designing a proof: convinced that it is true:

$$n, r \in \omega \ni r \leq n, \left(\binom{n}{r} = \frac{n!}{r!(n-r)!} \right)$$

7. Take advantage of Quiz 13.

8. Complete the following assignment prior to Meeting #14:

   A. Study our notes from Meeting #13.

   B. Comprehend Jim's sample response to Quiz 13.

   C*. Solve Lanfen's problem and display your computation (As usual upload the resulting pdf document on the appropriate *Canvas* Assignment link):

> In a lottery, players pick six different numbers from { 1, 2, 3, ..., 49 }; the order in which a player picks them is irrelevant. The lottery manager randomly selects (without replacement) six of the numbers from { 1, 2, 3, ..., 49 }; the six selected numbers are referred to as "winning numbers." A player wins the grand prize if they/he/she picked all of the winning numbers. A player wins the second prize exactly if five of her/his/their picks match five of the winning numbers. A player wins the third prize if exactly four of his/their/her picks match four of the winning numbers. Lanfen wants to know the probability the pick of a player wins the first prize, the probability that it wins the second prize, and that the probability that it wins the third prize.

   D. From the Video Page of *Canvas*, view with comprehension "combinations" and then do the same for "probability using combinations."

   E. Comprehend Jim's sample responses to the homework prompts that are posted on *Canvas*.

9. And from *XKCD*: