MATH 232 Discrete Math
Homework 8

Basic Information
This assignment is due in Gradescope by 10 PM on the dates below.

Make sure you understand MHC honor code and have carefully read and understood the additional information on the class syllabus and the grading rubric. I am happy to discuss any questions or concerns you have!

You are always welcome to ask me for small hints or suggestions on problems.

Problems

Reading Problem 8M (Due: Sunday, November 2)

Why are the outer edges of Pascal's triangle all 1s? Why is the next number in (from the left and from the right) always n?

Wednesday Problems HW8 (Due: Wednesday, November 5)

Deck of card background in case you need it. A standard deck of cards has 52 cards. There are four suits (hearts ♥, spades ♠, diamonds ♦, and clubs ♣) and each suit has 13 cards (the numbers 2 through 10 which I call the "number cards", the Ace , and the "face cards": king, queen, and jack). A "hand" is the set of cards you are dealt in a game like poker.

Be sure you completely justify your answer using properties or results from class. An answer without justification will earn 0 points.

1. Suppose a bag contains 100 apples, 100 strawberries, 100 peaches, and 100 kiwis. How many pieces of fruit must we pick out until we guarantee we have chosen at least a dozen pieces of fruit of the same kind? **Be sure to use results from class to justify this.**

2. A sandwich shop in your hometown offers 3 different breads (white, wheat, gluten free), 4 fillings (ham, turkey, salami, and veggie mix), and 5 cheeses (feta, provolone, cheddar, American, and gouda). How many different sandwiches could you order? (Assume you must include bread, 1 filling, and 1 cheese).

3. In poker, a hand consists of five cards dealt to a player. “Four of a kind” means your hand consists of four cards of the same face value (plus one other card). How many different “four of a kind" hands are there where we do not care what order the cards are dealt to you?

4. How many ways are there to pick three cards out of a deck of 52 cards if our first choice must be a 6, the second choice must be a face card, and the third choice must be a “number card" from the hearts suit? Assume we do not return the already picked cards to the deck for the next choice, and assume the order we pick these in matters, i.e., we must pick a 6 first, and then a face card, and then a hearts number.

5. How many 3-letter “words” (strings of characters, they don’t actually have to be identifiable words) can you form from the letters of the word STRONG? How many of those words contain an “S”? (You may not use a letter more than once.)

6. How many integers greater than 5400 have **both** of the following properties:
   (a) the digits are distinct, and (b) the digits 2 and 7 do not occur?

~~Reading Problem 8F~~

No Friday problem since we don’t have class.