MATH 232 Discrete Math
Homework 10

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 10M (Due: Sunday, December 1)

Problem coming later!

Wednesday Problems HW10 (Due: Wednesday, December 3)

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

1. Suppose you toss a 6-sided dice 10 times and record the number on the top of the dice each time. Use Inclusion-Exclusion to determine the number of ways those dice could be thrown so that each of the 6 numbers occur at least once in your list of 10 numbers. Here we assume tossing a 1 and then nine 6's is different than tossing nine 6's first and then a 1.

2. Determine the number of permutations of the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ in which at least one odd integer is fixed.

3. (a) A bakery sells 6 different kinds of pastry. If the bakery has at least a dozen of each kind, how many different options are there for a box of a dozen pastries?

(b) Say you visit the bakery from (a) at the end of the day. They now only have three kinds of pastries left: jelly doughnuts, cheese danishes, and cinnamon rolls. Also, they only have 6 jelly doughnuts left, 6 cheese danishes, and 3 cinnamon rolls. How many options are there for a box of 12 pastries?

4. Suppose you run a pet sitting service with 4 employees, and you currently have 12 dogs and 1 cat to care for. (I know some of you are going to be mad at me for saying this, but assume the dogs are indistinguishable.)
   (a) How many ways can you assign the pets to your employees?
   (b) How many ways can you assign the pets to your employees if each employee must be assigned at least 1 pet?

5. Suppose S is the multiset $\{1 \cdot a, 2 \cdot b, 2 \cdot c\}$. How many permutations of this set are there?

6. In how many ways can eleven pieces of identical candy be passed out to four children so that no child gets more than four pieces (and some children could get 0 pieces)?

Reading Problem 10F (Due: Friday, December 5)

Problem coming later!