Homework 9: Discrete Mathematics Spring 2021 – Counting

Due Sunday April 11th @11:59:00pm

Show all your work to receive full credit
Please note that we will make this a homework quiz in Gradescope

1. **Anagrams**
   (a) How many different anagrams (including nonsensical words) can be made from SUCCESS?
   (b) How many can be made if we require that the first and last letters must both be S?

2. You can choose between 5 printers, 10 monitors, 4 CPUs, 5 keyboards to build your next computer. How many ways to build your computer are there?

   You can leave your expression as is, no need to do the calculations.

3. A total of 300 students took the Regents exam. Only 60 of them will pass the exam. The The list of those who passed will be posted in decreasing order of scores.

   How many lists of posted results is possible?

4. You list all numbers between 0 and 999,999. How many times is digit 2 written?

5. **Binomial coefficients**

   What is the coefficient of x^{10} when $(x+3)^{40}$ is expanded?

6. **Binomial coefficients**

   What is the coefficient of x^{11} when $(3x-5)^{20}$ is expanded?

   You can leave your expression as is, no need to do the calculations.

7. **PIE**

   At a tourism club, tourists can mix and match different activities while visiting Mexico. There are 49 tourists visiting Hel-Ha Park (H), 61 tourists visiting Pyramid of Tenochtitlan (T), 52 tourists visiting Chichen Itsa (C), and 28 visiting the National Museum of Anthropology (M). There are exactly 20 tourists for any two of these visits, 10 tourists for any three of them and 5 taking all of them.

   Using inclusion-exclusion, calculate how many tourists are doing at least one or more visits.