MATH 425 Homework 1. Due Friday, Sep. 19, BEFORE THE CLASS STARTS

Problem 1. How many different letter arrangements can be made from the letters PROBABILITY.

Problem 2. There are 130 students at a school and three dormitories A, B, and C with capacities 30, 35, and 65 respectively.

(a) How many ways are there to fill up the dormitories?

(b) Suppose that of the 130 students, 60 are men and 70 are women and that A is an all men's dorm, B is an all women's dorm and C is co-ed. How many ways are there to fill up the dormitories?

Problem 3. In how many ways can ten people be seated in a row if:

(a) there are no restrictions on the seating arrangement?

(b) persons A and B must sit next to each other?

(c) there are 5 men and they must sit next to each other?

(d) there are 5 men and 5 women, and no 2 men or 2 women can sit next to each other?

Problem 4.

(a) How many 4 digit integers greater than or equal to 6000 (hence 6000, 6001, ..., 9999) have both of the following properties?

- The digits are distinct.
- The digits 2 and 7 do not occur.

(b) How many 4 digit integers greater than or equal to 5400 (hence 5400, 5401, ..., 9999) have the same properties?

Problem 5. Suppose there are 8 women and 6 men. A committee consisting of 3 men and 3 women is to be formed. How many different committees are possible under each of the following conditions.

(a) 2 of the men (Mr. X and Mr. Y) refuse to serve together.

(b) 1 man (Mr. X) and 1 woman (Ms. A) refuse to serve together.

Problem 6. In the expansion of $(a + 3b)^{12}$, what is the coefficient of a^4b^8?

Problem 7. There are 14 people to attend a dinner party and sit at a round table.

(a) How many ways can these 14 people be arranged at the table? (Two seating arrangements are equivalent if one is a rotation of the other.)

(b) Suppose there are 7 men and 7 women. How many seating arrangements are there if no two men are to sit together.

Problem 8 How many integer solutions of:

$$x_1 + x_2 + x_3 + x_4 = 32$$

satisfy, $x_1 \geq 1$, $x_2 \geq -4$, $x_3 \geq 0$, and $x_4 \geq 3$? (Hint: Set $y_1 = x_1 - 1$, $y_2 = x_2 + 4, \cdots$.)