Recitation 5

Q1: Ms. Jones has 10 books that she is going to put on her bookshelf. Of these, 4 are math books, 3 are chemistry books, 2 are history books, and 1 is a language book.

Ms. Jones wants to arrange her books so that all the books with the same subject are together on the shelf. How many different arrangements are possible?

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4! * 4! * 3! * 2! * 1!

4! (ordering) * 4!(math) * 3!(chem) * 2!(history) * 1!(language)

Q2: From a group of 5 women and 7 men, how many different committees consisting of 2 women and 3 men can be formed?

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(1) 5C2 * 2C3

5C2(choose 2 women from 5) * 7C3(choose 3 men from 7)

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(1) 5C2 * 7C3

5C2(choose 2 women from 5) * 7C3(choose 3 men from 7)

(2) 5C2 * 7C3 - 2C2 * 5C1 * 5C2 = 30 * 5C2

contradiction: 2C2 (two men together) * 5C1 (choose another man from the remaining 5 men) * 5C2(choose 2 women from 5)

Q3: How many 5-sequences can be made with the digits 1,1,1,8,9?

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5P2 * 3C3 = 5!/3!

(select 2 digits(8,9) from 5 digits first, order matters; then select 3 digits(1,1,1) from 3 digits, order does NOT matter)

(optional) Q4: How many 8-sequences can be made with the digits 1,1,2,2,3,3,4,5?

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$8C2 * 6C2 * 4P2 * 2C2 = 8!/(2!2!2!)$

(optional) Q5: How many 9-sequences can be made with the digits 1,1,1,2,2,3,3,4,5?

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$_3C_9 * {}_2C_6 * {}_2P_4 * {}_2C_2 = 9!/(3!2!2!)$