Math 301 Homework

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Complete the following problems. Fully justify each response.

- 1. Suppose a class contains 2n students, and they have projects to work on in pairs.
 - (a) How many different ways can the professor pair the students up?
 - (b) After the first project, the professor wishes to create new pairings, so that nobody will be working with the same partner a second time. How many ways can the professor create this second set of pairings?
- 2. Determine the number of ways to create a floral arrangement having n flowers, in which at least 3 flowers are daisies, at least 2 flowers are carnations, and no more than 5 flowers are roses. You may assume every flower is either a daisy, carnation, or rose.
- 3. Find an ordinary generating function for (a_n) for each of the following recurrence relations:
 - $a_{n+1} = \alpha a_n + \beta$ for $n \ge 0, a_0 = 0$.
 - $a_{n+2} = 2a_{n+1} a_n$ for $n \ge 0$, $a_0 = 0$, $a_1 = 1$