

# Combinatorics Ordering and Repetitions Review

Sunday, 11/8/09

1. There is a bookcase with four different books—A, B, C, and D.
  - (a) How many ways can you order the books on the bookshelf?
  - (b) Suppose you get book E as a present. How many ways can you order the five books A, B, C, D, and E?
  - (c) Suppose you didn't like E, and you gave it away. But you get another copy of book B in the mail as a present.
    - i. If you are asked how many ways there are to order the books, will your answer be the same as in c)? Why?
    - ii. How many ways are there to order the five books—A, B, B, C, D? What do you divide your answer in c) by to get this answer?
2. Suppose there are 20 people running for President of the United States. Suppose also that the Constitution is amended, and the runner-up becomes Vice-President. How many possibilities are there for President and Vice-President in this election, assuming nobody drops out of the race?
3. \*\*You are trying to make a bracelet, and you have a piece of string and five beads—Red, Red, Green, Purple and Blue. Assuming the bracelet can be rotated and flipped, how many UNIQUE bracelets can be made using the five beads?