

Combinatorics. Extra review questions 1. Time \_\_\_\_\_

Show all work for full or partial credit. Put a box around your final answer in each part.

1. Consider a round, rotating table with 8 seats, and 7 knights: one of whom is Lancelot and another of whom is Arthur.
  - How many ways to seat all seven knights, up to rotation? (One seat will be empty.)
  - How many ways (still up to rotation) to seat all 7, if Arthur and Lancelot have to be seated with at least two knights between them? (The empty seat doesn't count as a knight.)
2. Consider a round, rotating table with 14 seats, and 7 male guests and 7 female guests.
  - How many ways to seat all 14, up to rotation, if no two females may be adjacent?
3. Consider 5 male guests and 7 female guests.
  - How many ways to line up all 12 in a row if no two males may be adjacent?
  - How many ways to line up all 12 in a row if the females all must be adjacent?
4. On page 2, question 5 of quiz 3, we again are walking east and north from the lower left corner to the upper right of the neighborhood map of Parma: 3 blocks by 6 blocks.
  - How many ways to walk if you may not visit the corner of Gerald and 67th, and you may not visit the corner of Forest and 60th?
  - How many ways to walk if you may not use the block of Gerald from 67th to 60th, but you must use the block of 54th between Gerald and Kenneth?

5. You must distribute 20 identical donuts to five knights. (This is the same as buying 20 donuts of 5 types.)
  - How many ways to distribute them if each knight must get at least one donut, with no upper limits?
  - How many ways to distribute them if each knight must get at least one donut, but Arthur can have no more than 3, Lancelot can have no more than 2, and Gawain can have no more than 4?
6. Do number 45 from chapter 2 (page 66), but with 20 books on 7 shelves.
7. Study all quiz questions!
8. Study homework questions, especially those which are similar to quiz questions!
9. Study examples from notes!