Mathematics 150 Midterm Exam I – F. Goodman
October, 1999

1. How many ways are there to seat 5 women and 5 men around a circular table

(a) If there are no further restrictions.

(b) If the men (but not the women) must all sit together.

(c) If men and women must alternate.

2. How many integral solutions are there to

$$x_1 + x_2 + x_3 + x_4 = 25$$

(a) If all x_i are non-negative.

(b) If $x_1 \geq 1$, $x_2 \geq -1$, $x_3 \geq 0$, and $x_4 \geq 5$.

3. How many distinguishable rearrangements are there of the word "abracadabra".

4. In how may ways can 2 red and 6 blue rooks be placed on an 8-by-8 chessboard so that no two rooks are in the same row or column? Assume the two red rooks are indistinguishable and likewise the 6 blue rooks are indistinguishable.