MAT135a
Homework 1 (Due in class on January 21, 2015).

Problem 1. Fifteen married couples are at a dance lesson. Assume that (male-female) dance pairs are assigned at random. (a) What is the number of possible assignments? (b) What is the probability that each husband ends up dancing with his wife?

Problem 2. Three Finns and three Danes sit in a row at random. Compute: (a) the probability that the three Finns sit in three adjacent seats, and the same is true for the Danes; (b) the probability that the three Finns sit in three adjacent seats; (c) no two adjacent seats are occupied by citizens of the same nation.

Problem 3. Fifteen married couples are at a dance lesson, but now only five men and five women are selected at random, then randomly paired. (a) What is the number of possible dancing arrangements? (b) What is the probability that John Smith, one of the husbands, dances with Jane Smith, his wife?

Problem 4. A full deck of 52 cards contains 13 hearts. Pick 8 cards from the deck at random (a) without replacement and (b) with replacement. In each case compute the probability that you get no hearts. Explain your solution.

Problem 5. A traditional fair die is thrown twice. What is the probability that: (a) a four turns up exactly once? (b) both numbers are even? (c) the sum of the scores is 5? (d) the sum of the scores is divisible by 3?

Problem 6. Calculate the probability that a hand of 13 cards dealt from a normal shuffled pack of 52 contains exactly one king and two aces.

Problem 7. Twelve people are divided at random into three committees: A (3 people) B (4 people) and C (5 people). What is the probability that A consists of the 3 youngest people and C of the 5 oldest people?