

Stat 134: Section 6

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Problem 1

A lot of 50 items is inspected by the following two-stage plan.

- (i) A first sample of 5 items is drawn without replacement. If all are good the lot is passed; if two or more are bad the lot is rejected.
- (ii) If the first sample contains just one bad item, a second sample of 10 more items is drawn without replacement (from the remaining 45 items) and the lot is rejected if two or more of these are bad. Otherwise it is accepted.

Hint: Think sequentially.

Suppose there are 10 bad items in the lot.

- a. What is the probability that the second sample is drawn and contains more than one bad item?
- b. Write down an expression for the probability that the lot is accepted.

Ex 2.5.9 in Pitman's Probability

Problem 2

Eight cards are drawn from a well-shuffled deck of 52 cards. What is the probability that 8 cards contain:

Hint: Count carefully.

- a. 4 aces;
- b. 4 aces and 4 kings;
- c. 4 of a kind (any kind, including the possibility of 4 of two kinds).

Ex 2.rev.16 in Pitman's Probability

Problem 3

The matching problem. There are n letters addressed to n people at n different addresses. The n addresses are typed on n envelopes. A disgruntled secretary shuffles the letters and puts them in the envelopes in random order, one letter per envelope.

Hint: Inclusion-exclusion principle might be useful.

- a. Find the probability that at least one letter is put in correctly addressed envelope.
- b. What is this probability approximately, for large n ?

Ex 2.rev.28 in Pitman's Probability