

HOMEWORK 2 (4653, FALL 2008)

Read: *Rabinowitz*, chapters 3.1, 3.4, 3.5 and *Tijms*, chapters 6, 8.1, 8.2.

Solve: Problems 3, 5, 7 (i), 8 (ii), 19, 24, 27, 29 in *Rabinowitz*, p. 80–86, problems 6.2, 6.4, 6.8, 6.10, 6.12, 6.14 in *Tijms*, p. 217–219, problems 8.2, 8.4, 8.8, 8.14 in *Tijms*, p. 246–251, and the following problems:

A (20 points) Let $\sigma = (\sigma_1, \dots, \sigma_6) \in S_6$ be a random permutation of $\{1, \dots, 6\}$. Compute the following probabilities:

- a) $P(\sigma_1 + \sigma_2 = 6)$
- b) $P(\sigma_1 \cdot \sigma_2 = 6)$
- c) $P(1 \leq \sigma_1, \sigma_2, \sigma_3 \leq 3)$
- d) $P(1 \leq \sigma_1 \leq \sigma_2 \leq \sigma_3 \leq 3)$

B (20 points) Let A be a random subset of 5 (different) elements of $\{1, \dots, 20\}$. Compute probabilities of the following events:

- a) Set A contains 19, but all other elements in A are at most 6.
- b) All elements in A are at least 5 and at most 12.
- c) Exactly two elements in A are odd.
- d) All elements in A are odd and at least four of them are most 15.

P.S. All book problems are worth 10 points.

This Homework is due Thursday Sep 25 at 4:40 pm. (right before class). Please read the collaboration policy on the course web page. Make sure you write your name in the beginning and your collaborators' names at the end. If you are unable to bring it to class, please arrange it be brought by someone else (same deadline applies).

You MUST box all the answers. Remember that the answers are not enough, you also need to provide all intermediate calculations exhibiting your logic. However, no written explanations are necessary unless the problem asks for them.