Homework 1 of CS492(F) Computational Learning Theory
Deadline: 6:00pm on 15 October (Friday)

Submit your solutions in KLMS. (Reminder: We adopt a very strict policy for handling dishonest behaviours. If a student is found to copy answers from fellow students or other sources in his or her homework submission, she or he will get F.)

The numbers in the questions refer to exercise questions in the textbook of the course, i.e. "Foundations of Machine Learning" (2nd Edition) by Mohri et al.

Question 1

Solve 2.7. (20 marks)

Question 2

Solve 2.10. (20 marks)

Question 3

Solve 2.12. (20 marks)

Question 4

Solve 3.11. In the question 3.11(c), replace the equality by the inequality as follows:

$$\hat{\mathfrak{R}}_S(\mathcal{H}') \leq \frac{\Lambda}{m} \cdot \mathop{\mathbb{E}}_{\sigma} \left[\left\| \sum_{i=1}^{m} \sigma_i \mathbf{x}_i \right\|_2 \right].$$

(20 marks)

Question 5

Solve 3.23. (20 marks)