

## Homework 6

March 23th  
Due March 27th

Your assignment may be handwritten or typeset, but in any case it should be neat and readable. Your name, class number and assignment number should be clearly visible (like on this document for example). Multipage assignment must be stapled.

You are encouraged to work in groups for this assignment. However, the redaction should be done on one's own: do not copy some other student's work, or give your assignment to some other student. To consult textbooks or online resources is fair game; on the other hand, to look up the exact exercise and its solution is not.

### Exercises from the book

Included in this homework are exercises 2.12, 2.14, 2.16.

#### Exercise 1

A random variable  $X$  takes the following values:

$$\mathbb{P}(X = -1) = \frac{1}{4}, \quad \mathbb{P}(X = 0) = \frac{1}{12}, \quad \mathbb{P}(X = 0.4) = \mathbb{P}(X = 1) = \frac{1}{3}.$$

What is the expectation of  $X$ ? Its variance? Its third moment?

#### Exercise 2

A non-negative random variable  $X$  has expectation 2 and variance 1. What is the best upper bound you can give for  $\mathbb{P}(X \geq 4)$ ?