

## topics for the test (12.11. or 3. 12.)

(definition 1.1.1 refers to the **script** and would be definition 1.1 of the first chapter of the **lecture**...)

### 1. Probability spaces

- (1)  **$\sigma$ -algebra:** definition 1.1.1, example 1.1.2, propositions 1.1.4 and 1.1.5
- (2) **probability measure:** definition 1.2.1, example 1.2.2, proposition 1.2.4, definitions 1.2.5 and 1.2.9, assertion of proposition 1.2.14. with the 2 applications
- (3) **examples of distributions:** how to compute  $\mathbb{E}f$  and  $\mathbb{E}(f - \mathbb{E}f)^2$  if  $f$  has one of the distributions 1.3.1, 1.3.2, 1.3.3, 1.3.4

### 2. Random variables

- (1) **measurable step-function:** definition 2.1.1 + examples,
- (2) **measurable:** definition 2.1.2, assertion of proposition 2.1.3 definition 2.1.4, proposition 2.1.5 proposition 2.1.6, summary about random variables, example 2.2.4, proposition 2.2.5, definitions 2.2.6 and 2.2.8

### 3. Integration

- (1) **definition of the expectation:** definition 3.1.1, proposition 3.1.3, definitions 3.1.4 and 3.1.5
- (2) **properties of the expectation:** proposition 3.1.7, definition 3.1.8, assertion of lemma 3.1.9,
- (3) **fundamental theorems:** assertion of lemma 3.2.1 (about the "staircase function" = lemma 2.4 of chapter 3 in the lecture) monotone convergence, Lebesgue's Theorem, proposition 3.2.5
- (4) **connections to the Riemann-integral:** assertion of proposition 3.3.1
- (5) **change of variables:** assertion of proposition 3.5.1 + example

(6) **independence and product measure:** assertion of proposition 3.7.2 and assertion of lemma 3.7.3

(7) **inequalities** assertion of propositions 3.8.1, 3.8.3, 3.8.4, 3.8.6

#### **4. Sequences of random variables**

(1) definition 4.1.1, proposition 4.3.1

**Don't forget the exercises which are connected to the above.**

**In case of questions** come to MaD 304, for example on Mondays 12-14 (lecture time...)