

# Topics for the Test (18.03.09 or 08.04.09)

## 1. PROBABILITY SPACES

- (1)  **$\sigma$ -algebra:** definition 1.1.1 + 1.1.9, example 1.1.2, propositions 1.1.\*.
- (2) **probability measure:** definitions 1.2.1, 1.2.7, 1.2.9, 1.2.12, 1.2.13, 1.2.19, 1.2.20 and 1.2.22  
propositions 1.2.6, 1.2.17. and 1.2.23
- (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) **random variables+measurability:** definitions 2.1.2 and 2.2.7, proposition 2.1.3, 2.1.4 and 2.1.5, lemma 2.2.3, example 2.2.4, proposition 2.2.5, definitions 2.2.7 and 2.2.8, propositions 2.2.9 and 2.2.10.
- (3) **independence of random variables:** definition 2.3.2, proposition 2.3.4 + 2.3.5.

## 3. INTEGRATION

- (1) **definition of the expectation:** definition 3.1.1, 3.1.4 and 3.1.5, example 3.1.7
- (2) **properties of the expectation:** propositions 3.2.1, 3.2.3, 3.2.4+3.2.5, 3.2.6, 3.2.7 and 3.2.8
- (3) **connections to the Riemann-integral:** propositions 3.3.1+3.3.2
- (4) **change of variables:** proposition 3.4.1
  
- (7) **inequalities** propositions 3.6.1, 3.6.3, 3.6.5, 3.6.8