

Exam topics for the written and oral exam in measure theory

In the written exam there will be 20 true-false questions (with scoring +5 for correct answers, -5 for incorrect answers, 0 for blank answers), and 4 exercises to solve (25 points each). You need to score at least 40% on both parts.

In the oral exam we will not follow the standard procedure of exposition of two exam topics. Rather, I will assess your overall knowledge of the subject by asking definitions and theorems related to true-false questions. I may also ask outline of proofs for certain theorems listed at the end of this file.

The exam topics are the following:

Jordan measure (Mosonyi 1.1, 1.2, 1.3, 1.4, 1.7)

Semi-rings, products, additive set functions (Mosonyi 1.11, 1.12, 1.14, 1.15, 1.20, 1.22, 1.25, 1.27, 1.32)

Measures spaces, outer measures, Caratheodory extension, Lebesgue measure, completion (Mosonyi: 2.1, 2.5, 2.7, 2.10, 2.21, 2.22, 2.30, 2.31, 2.32, 2.34, Folland: 1.8, 1.9)

Borel sigma-algebra, Lebesgue-Stieltjes measures (Folland: 1.1, 1.2, 1.3, 1.6, 1.15, 1.16, 1.18)

Measurable functions (Folland: 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.10)

Integration (Folland: 2.13, 2.14, 2.15, 2.16, 2.18, 2.22, 2.24, 2.25, 2.26, 2.27)

Modes of convergence (Folland: 2.29, 2.30, 2.32, 2.33)

Product measures and Fubini's theorem (Folland: 2.34, 2.36, 2.37, 2.39)

The n-dimensional Lebesgue measure (Folland: 2.40, 2.42, 2.44, 2.46, 2.47, 2.49, 2.51, 2.53, 2.54)

L^p spaces (Folland: 6.1, 6.2, 6.5, 6.6, 6.7, 6.8, 6.13, 6.15, 6.16, 6.17)

Signed measures, Hahn decomposition, Jordan decomposition, Radon-Nikodym derivative (Folland: 3.3, 3.4, 3.5, 3.6, 3.8, 3.9, 3.10, 3.11)

Functions of bounded variation (Folland: 3.23, 3.25, 3.26, 3.27, 3.29, 3.30, 3.32, 3.35)

Proofs that I may ask at the oral exam: Folland 1.2, 1.8, 1.9, 2.6, 2.10, 2.14, 2.16, 2.24, 2.29, 2.34, 2.37, 6.2, 6.6, 6.17, 3.4, 3.26.