

The exam questions of «Theory of functions of real variable»

1. Sets and their mappings.
2. Equivalence of sets. Countable sets.
3. The power of the set. Power sets of the continuum.
4. A system of sets, a ring and a semiring of sets.
5. The concept of measure of sets. Extension of a measure from a semiring to a minimal ring and its properties. Countably additive measure and its properties..
6. External measure of sets. Lebesgue measurable sets.
7. Measurable functions. Measurability of the pointwise limit of a sequence of measurable functions.
8. Equivalence of measurable functions. Convergence almost everywhere of a sequence of measurable functions.
9. Egorov's theorem on the connection between convergence almost everywhere and uniform convergence of a sequence of measurable functions
10. Convergence in measure of a sequence of measurable functions. Riesz's theorem.
11. Simple functions and the Lebesgue integral of simple functions. General definition of the Lebesgue integral and its properties.
12. Absolute continuity and countable additivity of the Lebesgue integral.
13. Theorems of Lebesgue, Levy and Fatou on passing to the limit under the sign of the Lebesgue integral.
14. Comparison of the Lebesgue integral with the Riemann integral.
15. The product of measures. Fubini's theorem.

L I T E R A T U R E

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3. И.П.Натансон, Теория функций вещественной переменной М, 1952, 416 с.
4. R.G.Bartle. The elements of integration New York, Wiley, 1966, 129p.
5. W.Rudin. Real and complex analysis New York, 1974, 412p.