

Preparation material for Test # 1

Ex. 1. You will be asked three to five questions of the following form.

- State the Distributive Axiom.
- State the Completeness Axiom.
- State the Well Ordering Principle.
- State the Induction Principle.
- State the Archimedean Property.
- State the Triangle Inequality.
- State the Greatest Lower Bound Axiom.
- State the definition of arbitrary closeness, $p \sim A$, and a characterization theorem for $p \sim A$ in terms of open intervals.
- State the definition of A^\sim and sketch the proof that $(A \cup B)^\sim = A^\sim \cup B^\sim$.
- State the definition of f jumps at p , where $f: X \rightarrow \mathbb{R}$ and $p \in X \subset \mathbb{R}$.
- State the definition of f is continuous at p , where $f: X \rightarrow \mathbb{R}$ and $p \in X \subset \mathbb{R}$, and a characterization theorem for f is continuous at p in terms of ε and δ .
- State the definitions of *limit point* and *isolated point* of $A \subset \mathbb{R}$.
- State the definition of A^ℓ .
- State the definition of a limit, $\lim_{x \rightarrow p} f(x) = L$, and a characterization theorem for $\lim_{x \rightarrow p} f(x) = L$ in terms of arbitrary closeness.
- State Maximum-Minimum Theorem.

Ex. 2. You may be asked to sketch the proof of one the following theorems. (The text of the numbered theorem will be given.)

- Theorem 3.1, 3.16, 4.2, 4.9, 4.19;
- Substitution Theorem, Squeeze Theorem; Intermediate Value Theorem, Nested Interval Property;

Ex. 3. You may be asked to solved two to four of the problems similar to the following exercises.

- 2.17, 2.18, 2.26, 2.31, 3.20, 4.7, 4.8, 4.14, 4.15, 4.22, 4.23, 4.24, 4.33, 4.35, 5.3, 5.5, 5.7, 5.7, 5.10, 5.15, 5.17, 5.19, 5.20, 5.21;
- 3.3, 3.5, 3.8 using ε - δ definition only.

Preparation material for Test # 2

Ex. 1. You will be asked one to three questions of the following form.

- State the definition of a derivative of $f: X \rightarrow \mathbb{R}$ where $X \subset \mathbb{R}$ has no isolated points.
- State the Chain Rule.
- State the Inverse Function Theorem.
- Define local extremum point for a function $f: X \rightarrow \mathbb{R}$, where $X \subset \mathbb{R}$.
- Define a critical point of $f: \mathbb{R} \rightarrow \mathbb{R}$.
- State the First Derivative Test for Local Extrema.
- State the definition of f is concave down on an interval I .
- State the theorem characterizing concave up functions in terms on the second derivative.
- Define an inflection point of $f: \mathbb{R} \rightarrow \mathbb{R}$.
- State the definition of f is a Darboux function on an interval I .

Ex. 2. You may be asked to sketch the proof of one the following theorems. (The text of the numbered theorem will be given.)

- Theorem 6.14, 7.1, 7.3, 10.7;
- Product Rule Theorem, Quotient Rule Theorem, Rolle's Theorem, Mean Value Theorem;

Ex. 3. You may be asked to solved two to four of the problems similar to the following exercises.

- 6.19, 6.20, 6.24, 7.8, 7.9, 7.10, 7.20, 7.26, 7.27, 8.11, 8.12, 8.26, 8.27, 8.28, 9.8, 9.9, 9.20, 9.21, 10.3, 10.4, 10.6, 10.14, 10.15, 10.16, 10.24, 10.25, 10.26, 10.47;
- 6.5, 6.8 using the definition of the derivative only.

Preparation material for Final Test

The format of the test will be similar to that of previous two tests. Thus, use the preparation material I gave you for Tests #1 and #2. In addition, look over the following material.

Ex. 1. You may be asked some questions of the following form.

- State the definition of f is a *Darboux function on an interval* I .
- Define a partition of $[a, b]$.
- Define the upper sum $U_P(f)$ (lower sum $L_P(f)$) of f with respect to a partition P .
- Define $\int_a^b f$, $\overline{\int}_a^b f$, and/or $\int_a^b f$.
- Define uniformly continuous function $f: X \rightarrow \mathbb{R}$.

Ex. 2. You may be asked to sketch the proof of one the following theorems. (The text of the numbered theorem will be given.)

- Theorem 12.31, 12.33, 14.2 (the Fundamental Theorem of Calculus).

Ex. 3. You may be asked to solved some of the problems similar to the following exercises. (This may include providing the examples similar to that stated in the problems.)

- 12.12, 12.22, 12.23, 12.24, 12.25, 12.26, 12.27, 12.29, 12.30, 12.34, 13.18, 13.19, 13.29, 13.30, 14.3, 14.5, 14.7.