Fundamentals of Mathematics

Bernd Schröder
What are the Fundamentals of Mathematics?

1. Linear Algebra and Analysis?
2. Algebra and Topology?
3. Set Theory and Logic?
4. There really isn't a definite answer.

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But on Certain Things There is Agreement
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2. Everything in mathematics can be constructed from the axioms of set theory, and sets are used throughout mathematics.
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1. Mathematicians do proofs, and proofs require logic.
2. Everything in mathematics can be constructed from the axioms of set theory, and sets are used throughout mathematics.
3. The familiar number systems are also used throughout mathematics.
So It Makes Sense To Have A First Proof Class That Covers
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1. Proofs

... and if things go really fast, the unsolvability of the quintic with radicals is really neat. (Otherwise, read it and watch the presentations at your leisure.)
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What Will Help You “Get Through”?

1. Biggest change: We cannot simply mimic examples any more: The proofs of the results are the examples.
2. Total recall would help, but that is not an option for most of us. And it may not be as useful as we may think.
3. Keep the book and notes on key definitions handy.
4. Structure your thinking.
   4.1 Segmenting of arguments helps see the forest for the trees.
   4.2 Presentation space is limited to one pane.
   4.3 But we will go through arguments that are much longer than that.
5. Be patient. One problem in this course can take longer than five problems in a calculus class. (So don't get frustrated either.)
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