MATH 2001 FALL 2025 - REVIEW FOR MIDTERM 1

Numbers refer to sections in Hammack, Book of Proof.

1. **Sets.**
   (1) Constructions:
       (a) set builder notation, Axioms of Specification and Replacement (1.2)
       (b) Cartesian product, Axiom of Pairing (1.2)
       (c) subsets (1.3), power set (1.4)
       (d) union, intersection, difference (1.5), complement (1.6)
       (e) indexed unions and intersections: Axiom of Union (1.8)
   (2) Proving identities for sets:
       (a) laws of set operations, Venn diagrams (1.7)
       (b) proving $x \in A$, $A \subseteq B$, $A = B$ (see also 8.1-8.3)

2. **Logic.**
   (1) Statements:
       (a) logical connectives $\wedge, \vee, \sim$ (2.2), if $\Rightarrow$ (2.3), iff $\Leftrightarrow$ (2.4)
       (b) truth tables, Boolean functions (2.5)
       (c) logical equivalence (2.6)
   (2) Quantifiers (2.7):
       (a) negating quantified statements
       (b) checking whether quantified statement is true (proof for universally quantified statement, example for existentially quantified statement)